



European Network of  
Transmission System Operators  
for Electricity

---

# REMEDIAL ACTION SCHEDULE PROFILE SPECIFICATION

---

2023-05-10

---

APPROVED DOCUMENT  
VERSION 2.2

## 1 Copyright notice:

2 **Copyright © ENTSO-E. All Rights Reserved.**

3 This document and its whole translations may be copied and furnished to others, and derivative  
4 works that comment on or otherwise explain it or assist in its implementation may be prepared,  
5 copied, published and distributed, in whole or in part, without restriction of any kind, provided  
6 that the above copyright notice and this paragraph are included on all such copies and  
7 derivative works. However, this document itself may not be modified in any way, except for  
8 literal and whole translation into languages other than English and under all circumstances, the  
9 copyright notice or references to ENTSO-E may not be removed.

10 This document and the information contained herein is provided on an "as is" basis.

11 **ENTSO-E DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT**  
12 **LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT**  
13 **INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR**  
14 **FITNESS FOR A PARTICULAR PURPOSE.**

15 **This document is maintained by the ENTSO-E CIM WG. Comments or remarks are to be**  
16 **provided at [cim@entsoe.eu](mailto:cim@entsoe.eu)**

17 **NOTE CONCERNING WORDING USED IN THIS DOCUMENT**

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

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

32

33

## 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. Association to OverlappingZone was added to the profile.
2	0	2022-02-16		SOC approved.
2	1	2022-09-21		SOC approved.
2	2	2023-05-10		ICTC approved.

34	<b>CONTENTS</b>		
35	Copyright notice:.....		2
36	Revision History.....		3
37	CONTENTS .....		4
38	1 Introduction .....		8
39	2 Application profile specification .....		8
40	2.1 Version information .....		8
41	2.2 Constraints naming convention .....		8
42	2.3 Profile constraints .....		9
43	2.4 Metadata.....		11
44	2.4.1 Constraints .....		11
45	2.4.2 Reference metadata .....		11
46	3 Detailed Profile Specification .....		12
47	3.1 General.....		12
48	3.2 (abstract,NC) AvailabilityRemedialAction .....		12
49	3.3 (NC,Description) AvailabilitySchedule .....		12
50	3.4 (abstract,NC) BaselrregularTimeSeries .....		13
51	3.5 (abstract,NC) BaseTimeSeries .....		13
52	3.6 (abstract) Contingency root class .....		13
53	3.7 (NC) CountertradeScheduleAction .....		13
54	3.8 (NC) EventSchedule .....		14
55	3.9 (NC) EventTimePoint root class .....		14
56	3.10 (abstract,NC) GenericValueSchedule .....		15
57	3.11 (NC) GenericValueTimePoint root class .....		15
58	3.12 (abstract,NC) GridStateAlteration .....		16
59	3.13 (NC) GridStateIntensitySchedule .....		16
60	3.14 (abstract) IdentifiedObject root class .....		17
61	3.15 (abstract,NC) PowerBidSchedule .....		17
62	3.16 (NC) PowerSchedule .....		17
63	3.17 (abstract,NC) PowerScheduleAction .....		18
64	3.18 (NC) PowerTimePoint root class .....		18
65	3.19 (NC) ProposingRemedialActionScheduleShare root class .....		19
66	3.20 (NC) RedispatchScheduleAction .....		19
67	3.21 (abstract,NC) RemedialAction .....		20
68	3.22 (NC) RemedialActionCost root class .....		20
69	3.23 (NC) RemedialActionSchedule .....		21
70	3.24 (NC) RemedialActionScheduleAcceptance root class .....		22
71	3.25 (NC) RemedialActionScheduleGroup .....		23
72	3.26 (NC,Description) RemedialActionScheme root class .....		23
73	3.27 (abstract,NC) Region root class .....		23
74	3.28 (abstract,NC) ScheduleResource root class .....		23
75	3.29 (NC,Description) SchemeRemedialAction .....		23
76	3.30 (abstract,NC) SecurityCoordinator root class .....		24
77	3.31 (abstract,NC) SystemOperator root class .....		24

78	3.32	(NC) CostSettledKind enumeration .....	24
79	3.33	(NC) RemedialActionScheduleAcceptanceKind enumeration .....	24
80	3.34	(NC) TimeSeriesInterpolationKind enumeration .....	25
81	3.35	(NC) RemedialActionScheduleStatusKind enumeration .....	25
82	3.36	Currency enumeration .....	25
83	3.37	UnitMultiplier enumeration .....	29
84	3.38	UnitSymbol enumeration .....	30
85	3.39	(NC) ValueOffsetKind enumeration .....	31
86	3.40	ActivePower datatype .....	31
87	3.41	RealEnergy datatype .....	31
88	3.42	ReactivePower datatype .....	31
89	3.43	Seconds datatype .....	32
90	3.44	Boolean primitive .....	32
91	3.45	Integer primitive .....	32
92	3.46	DateTime primitive .....	32
93	3.47	Duration primitive .....	32
94	3.48	Decimal primitive .....	32
95	3.49	Float primitive .....	32
96	3.50	String primitive .....	32
97	Annex A (informative): Sample data .....		33
98	A.1	General .....	33
99	A.2	Sample instance data .....	33
100			
101	<b>List of figures</b>		
102	Figure 1 – Other diagram		
103	RemedialActionScheduleProfile::RemedialActionScheduleProfile .....		12
104			
105	<b>List of tables</b>		
106	Table 1 – Attributes of RemedialActionScheduleProfile::AvailabilityRemedialAction .....		12
107	Table 2 – Attributes of RemedialActionScheduleProfile::AvailabilitySchedule .....		12
108	Table 3 – Association ends of RemedialActionScheduleProfile::AvailabilitySchedule		
109	with other classes .....		13
110	Table 4 – Attributes of RemedialActionScheduleProfile::BaseIrregularTimeSeries .....		13
111	Table 5 – Attributes of RemedialActionScheduleProfile::BaseTimeSeries .....		13
112	Table 6 – Attributes of RemedialActionScheduleProfile::CountertradeScheduleAction .....		14
113	Table 7 – Association ends of		
114	RemedialActionScheduleProfile::CountertradeScheduleAction with other classes .....		14
115	Table 8 – Attributes of RemedialActionScheduleProfile::EventSchedule .....		14
116	Table 9 – Association ends of RemedialActionScheduleProfile::EventSchedule with		
117	other classes .....		14
118	Table 10 – Attributes of RemedialActionScheduleProfile::EventTimePoint .....		15
119	Table 11 – Association ends of RemedialActionScheduleProfile::EventTimePoint with		
120	other classes .....		15

121	Table 12 – Attributes of RemedialActionScheduleProfile::GenericValueSchedule .....	15
122	Table 13 – Association ends of	
123	RemedialActionScheduleProfile::GenericValueSchedule with other classes .....	15
124	Table 14 – Attributes of RemedialActionScheduleProfile::GenericValueTimePoint .....	15
125	Table 15 – Association ends of	
126	RemedialActionScheduleProfile::GenericValueTimePoint with other classes .....	16
127	Table 16 – Attributes of RemedialActionScheduleProfile::GridStateAlteration .....	16
128	Table 17 – Attributes of RemedialActionScheduleProfile::GridStateIntensitySchedule .....	16
129	Table 18 – Association ends of	
130	RemedialActionScheduleProfile::GridStateIntensitySchedule with other classes .....	16
131	Table 19 – Attributes of RemedialActionScheduleProfile::IdentifiedObject .....	17
132	Table 20 – Attributes of RemedialActionScheduleProfile::PowerBidSchedule .....	17
133	Table 21 – Attributes of RemedialActionScheduleProfile::PowerSchedule .....	17
134	Table 22 – Attributes of RemedialActionScheduleProfile::PowerScheduleAction .....	18
135	Table 23 – Association ends of RemedialActionScheduleProfile::PowerScheduleAction	
136	with other classes .....	18
137	Table 24 – Attributes of RemedialActionScheduleProfile::PowerTimePoint .....	18
138	Table 25 – Association ends of RemedialActionScheduleProfile::PowerTimePoint with	
139	other classes .....	19
140	Table 26 – Attributes of	
141	RemedialActionScheduleProfile::ProposingRemedialActionScheduleShare .....	19
142	Table 27 – Association ends of	
143	RemedialActionScheduleProfile::ProposingRemedialActionScheduleShare with other	
144	classes .....	19
145	Table 28 – Attributes of RemedialActionScheduleProfile::RedispatchScheduleAction .....	20
146	Table 29 – Association ends of	
147	RemedialActionScheduleProfile::RedispatchScheduleAction with other classes .....	20
148	Table 30 – Attributes of RemedialActionScheduleProfile::RemedialAction .....	20
149	Table 31 – Attributes of RemedialActionScheduleProfile::RemedialActionCost .....	20
150	Table 32 – Association ends of RemedialActionScheduleProfile::RemedialActionCost	
151	with other classes .....	21
152	Table 33 – Attributes of RemedialActionScheduleProfile::RemedialActionSchedule .....	21
153	Table 34 – Association ends of	
154	RemedialActionScheduleProfile::RemedialActionSchedule with other classes .....	22
155	Table 35 – Attributes of	
156	RemedialActionScheduleProfile::RemedialActionScheduleAcceptance .....	22
157	Table 36 – Association ends of	
158	RemedialActionScheduleProfile::RemedialActionScheduleAcceptance with other	
159	classes .....	22
160	Table 37 – Attributes of	
161	RemedialActionScheduleProfile::RemedialActionScheduleGroup .....	23
162	Table 38 – Attributes of RemedialActionScheduleProfile::RemedialActionScheme .....	23
163	Table 39 – Attributes of RemedialActionScheduleProfile::SchemeRemedialAction .....	24
164	Table 40 – Association ends of	
165	RemedialActionScheduleProfile::SchemeRemedialAction with other classes .....	24

166	Table 41 – Literals of RemedialActionScheduleProfile::CostSettledKind .....	24
167	Table 42 – Literals of	
168	RemedialActionScheduleProfile::RemedialActionScheduleAcceptanceKind.....	24
169	Table 43 – Literals of RemedialActionScheduleProfile::TimeSeriesInterpolationKind .....	25
170	Table 44 – Literals of	
171	RemedialActionScheduleProfile::RemedialActionScheduleStatusKind .....	25
172	Table 45 – Literals of RemedialActionScheduleProfile::Currency .....	25
173	Table 46 – Literals of RemedialActionScheduleProfile::UnitMultiplier .....	30
174	Table 47 – Literals of RemedialActionScheduleProfile::UnitSymbol .....	30
175	Table 48 – Literals of RemedialActionScheduleProfile::ValueOffsetKind .....	31
176	Table 49 – Attributes of RemedialActionScheduleProfile::ActivePower .....	31
177	Table 50 – Attributes of RemedialActionScheduleProfile::RealEnergy .....	31
178	Table 51 – Attributes of RemedialActionScheduleProfile::ReactivePower .....	31
179	Table 52 – Attributes of RemedialActionScheduleProfile::Seconds.....	32
180		

## 181 1 Introduction

182 The remedial action schedule profile is a profile to exchange a list of proposed, agreed, rejected,  
183 etc. remedial action schedules.

184 Each grid state alteration defined as part of an available remedial action (by the remedial action  
185 profile) gets a schedule for the parameter that should be modified when the remedial action  
186 schedule is agreed and ordered. The remedial action schedule profile allows for several data  
187 exchanges:

- 188 - List of remedial action schedules as output from a security analysis
- 189 - An exchange of the status of the remedial action
- 190 - An exchange of the agreements per TSO.

191

## 192 2 Application profile specification

### 193 2.1 Version information

194 The content is generated from UML model file CIM100\_CGMES31v01\_501-  
195 20v02\_NC22v95\_MM10v01.eap.

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

- 197 - Title: Remedial Action Schedule Vocabulary
- 198 - Keyword: RAS
- 199 - Description: This vocabulary is describing the remedial action schedule profile.
- 200 - Version IRI: <http://entsoe.eu/ns/CIM/RemedialActionSchedule-EU/2.2>
- 201 - Version info: 2.2.0
- 202 - Prior version: <http://entsoe.eu/ns/CIM/RemedialActionSchedule-EU/2.1>
- 203 - Conforms to: urn:iso:std:iec:61970-600-2:ed-1|urn:iso:std:iec:61970-301:ed-  
204 7:amd1|file://iec61970cim17v40\_iec61968cim13v13a\_iec62325cim03v17a.eap|urn:iso:  
205 std:iec:61970-401:draft:ed-1|urn:iso:std:iec:61970-501:draft:ed-2|file://CGMES-  
206 30v25\_501-20v01.eap
- 207 - Identifier: urn:uuid:6e90c546-3c6c-471b-8040-e05037081c59

208

### 209 2.2 Constraints naming convention

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

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

213 where

214 rule.Type: C – for constraint; R – for requirement



215 rule.Standard: the number of the standard e.g. 301 for 61970-301, 456 for 61970-456, 13 for  
216 61968-13. 61970-600 specific constraints refer to 600 although they are related to one or  
217 combination of the 61970-450 series profiles. For NC profiles, NC is used.

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

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

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

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

### 225 2.3 Profile constraints

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

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

- 231 • C:452:ALL:NA:datatypes

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

- 234 • R:452:ALL:NA:exchange

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

- 237 • R:452:ALL:NA:exchange1

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

- 243 • R:452:ALL:NA:exchange2

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

- 252 • R:452:ALL:NA:exchange3

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

- 256 • R:452:ALL:NA:exchange4

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

- 268 • R:452:ALL:NA:cardinality

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

- 274 • R:452:ALL:NA:associations

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

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

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

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

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

- 289 • R:452:ALL:NA:uniqueIdentifier

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

- 292 • R:452:ALL:NA:unitMultiplier

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

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

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

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

298 The string IdentifiedObject.description is maximum 256 characters.

- 299       • C:452:ALL:NA:float

300       An attribute that is defined as float (e.g. has a type Float or a type which is a Datatype  
301       with .value attribute of type Float) shall support ISO/IEC 60559:2020 for floating-point  
302       arithmetic using single precision floating point. A single precision float supports 7  
303       significant digits where the significant digits are described as an integer, or a decimal  
304       number with 6 decimal digits. Two float values are equal when the significant with 7  
305       digits are identical, e.g. 1234567 is equal 1.234567E6 and so are 1.2345678 and  
306       1.234567E0.

- 307       • R:NC:ALL:Region:reference

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

- 310       • R:NC:ALL:SystemOperator:reference

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

- 312       • C:NC:RAS:RemedialActionSchedule:proposingEntity

313       The RemedialActionSchedule shall have a proposing entity either the Security  
314       Coordinator (RemedialActionSchedule.ProposingEntity) or at least one  
315       ProposingRemedialActionScheduleShare.

## 316   2.4   Metadata

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

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

### 326   2.4.1   Constraints

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

- 329       • R:NC:ALL:wasAttributedTo:usage

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

331

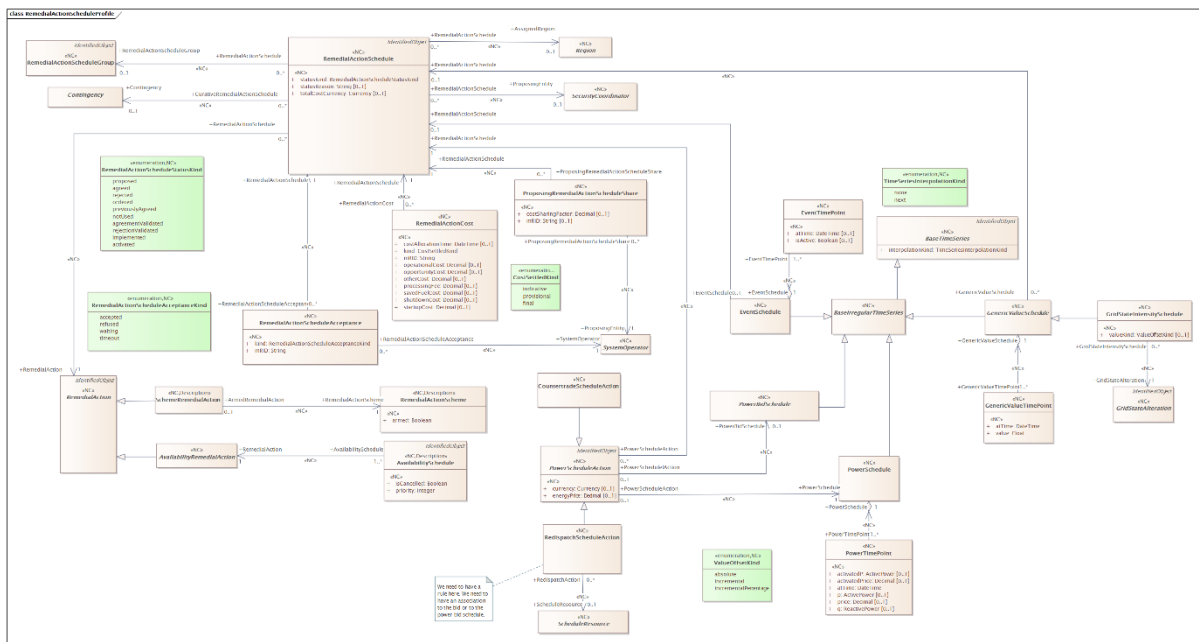
### 332   2.4.2   Reference metadata

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

341 **3 Detailed Profile Specification**

342 **3.1 General**

343 This package contains remedial action schedule profile.



344  
345 **Figure 1 – Other diagram**  
346 **RemedialActionScheduleProfile::RemedialActionScheduleProfile**

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

348 **3.2 (abstract,NC) AvailabilityRemedialAction**

349 Inheritance path = [RemedialAction](#) : [IdentifiedObject](#)

350 Availability remedial action is a remedial action that cancels or reschedules an availability  
351 schedule.

352 Table 1 shows all attributes of AvailabilityRemedialAction.

353 **Table 1 – Attributes of RemedialActionScheduleProfile::AvailabilityRemedialAction**

name	mult	type	description
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

354  
355 **3.3 (NC,Description) AvailabilitySchedule**

356 Inheritance path = [IdentifiedObject](#)

357 A given (un)availability schedule with a given status and cause that include multiple equipment  
358 that need to follow the same scheduling periods.

359 Table 2 shows all attributes of AvailabilitySchedule.

360 **Table 2 – Attributes of RemedialActionScheduleProfile::AvailabilitySchedule**

name	mult	type	description
isCancelled	1..1	<a href="#">Boolean</a>	(NC) Defines the cancelling of the availability schedule. True means that is cancelling, False means that it is not cancelling.

name	mult	type	description
priority	1..1	<a href="#">Integer</a>	(NC) Value 0 means ignore priority. 1 means the highest priority, 2 is the second highest priority.
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

361

362

Table 3 shows all association ends of AvailabilitySchedule with other classes.

363

**Table 3 – Association ends of RemedialActionScheduleProfile::AvailabilitySchedule with other classes**

364

mult from	name	mult to	type	description
1..*	RemedialAction	1..1	<a href="#">AvailabilityRemedialAction</a>	(NC) Remedial action that is cancelling this availability schedule.

365

366

### 3.4 (abstract,NC) BaselregularTimeSeries

367

Inheritance path = [BaseTimeSeries](#) : [IdentifiedObject](#)

368

Time series that has irregular points in time.

369

Table 4 shows all attributes of BaselregularTimeSeries.

370

**Table 4 – Attributes of RemedialActionScheduleProfile::BaselregularTimeSeries**

name	mult	type	description
interpolationKind	1..1	<a href="#">TimeSeriesInterpolationKind</a>	inherited from: <a href="#">BaseTimeSeries</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

371

372

### 3.5 (abstract,NC) BaseTimeSeries

373

Inheritance path = [IdentifiedObject](#)

374

Time series of values at points in time.

375

Table 5 shows all attributes of BaseTimeSeries.

376

**Table 5 – Attributes of RemedialActionScheduleProfile::BaseTimeSeries**

name	mult	type	description
interpolationKind	1..1	<a href="#">TimeSeriesInterpolationKind</a>	Kind of interpolation done between time point.
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

377

378

### 3.6 (abstract) Contingency root class

379

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

380

### 3.7 (NC) CountertradeScheduleAction

381

Inheritance path = [PowerScheduleAction](#) : [IdentifiedObject](#)

382

Countertrade schedule action is an action to rearrange power schedules based on a Generation and Load Shift Key (GLSK) strategy.

383

384 Table 6 shows all attributes of CountertradeScheduleAction.

385 **Table 6 – Attributes of RemedialActionScheduleProfile::CountertradeScheduleAction**

name	mult	type	description
currency	0..1	<a href="#">Currency</a>	(NC) inherited from: <a href="#">PowerScheduleAction</a>
energyPrice	0..1	<a href="#">Decimal</a>	(NC) inherited from: <a href="#">PowerScheduleAction</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

386

387 Table 7 shows all association ends of CountertradeScheduleAction with other classes.

388 **Table 7 – Association ends of**  
389 **RemedialActionScheduleProfile::CountertradeScheduleAction with other classes**

mult from	name	mult to	type	description
0..1	PowerBidSchedule	0..1	<a href="#">PowerBidSchedule</a>	(NC) inherited from: <a href="#">PowerScheduleAction</a>
0..*	RemedialActionSchedule	1..1	<a href="#">RemedialActionSchedule</a>	(NC) inherited from: <a href="#">PowerScheduleAction</a>
0..1	PowerSchedule	1..1	<a href="#">PowerSchedule</a>	(NC) inherited from: <a href="#">PowerScheduleAction</a>

390

### 391 3.8 (NC) EventSchedule

392 Inheritance path = [BaselIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

393 Time series represent irregular event described by event points in time.

394 Table 8 shows all attributes of EventSchedule.

395 **Table 8 – Attributes of RemedialActionScheduleProfile::EventSchedule**

name	mult	type	description
interpolationKind	1..1	<a href="#">TimeSeriesInterpolationKind</a>	inherited from: <a href="#">BaseTimeSeries</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

396

397 Table 9 shows all association ends of EventSchedule with other classes.

398 **Table 9 – Association ends of RemedialActionScheduleProfile::EventSchedule with**  
399 **other classes**

mult from	name	mult to	type	description
0..1	RemedialActionSchedule	0..1	<a href="#">RemedialActionSchedule</a>	Remedial action schedule is the event that is validity for the given time series.

400

### 401 3.9 (NC) EventTimePoint root class

402 Event valid for a given point in time.

403 Table 10 shows all attributes of EventTimePoint.

404 **Table 10 – Attributes of RemedialActionScheduleProfile::EventTimePoint**

name	mult	type	description
atTime	0..1	<a href="#">DateTime</a>	(NC) The time the data is valid for.
isActive	0..1	<a href="#">Boolean</a>	(NC) True, if the event is occurring (Active) at this time point. Otherwise false.

405

406 Table 11 shows all association ends of EventTimePoint with other classes.

407 **Table 11 – Association ends of RemedialActionScheduleProfile::EventTimePoint with**  
408 **other classes**

mult from	name	mult to	type	description
1..*	EventSchedule	1..1	<a href="#">EventSchedule</a>	(NC) Time series the time point values belongs to.

409

410 **3.10 (abstract,NC) GenericValueSchedule**411 Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)412 Time series represent irregular generic value at given points in time. The type of value is given  
413 by the reference association.

414 Table 12 shows all attributes of GenericValueSchedule.

415 **Table 12 – Attributes of RemedialActionScheduleProfile::GenericValueSchedule**

name	mult	type	description
interpolationKind	1..1	<a href="#">TimeSeriesInterpolationKind</a>	inherited from: <a href="#">BaseTimeSeries</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

416

417 Table 13 shows all association ends of GenericValueSchedule with other classes.

418 **Table 13 – Association ends of RemedialActionScheduleProfile::GenericValueSchedule**  
419 **with other classes**

mult from	name	mult to	type	description
0..*	RemedialActionSchedule	0..1	<a href="#">RemedialActionSchedule</a>	(NC) Remedial action schedule which has generic value schedules.

420

421 **3.11 (NC) GenericValueTimePoint root class**

422 Generic value for a given point in time.

423 Table 14 shows all attributes of GenericValueTimePoint.

424 **Table 14 – Attributes of RemedialActionScheduleProfile::GenericValueTimePoint**

name	mult	type	description
atTime	1..1	<a href="#">DateTime</a>	(NC) The time the data is valid for.
value	1..1	<a href="#">Float</a>	(NC) The value at the time. The meaning of the value is defined by the derived type of the associated schedule. The value can be integer, float or boolean. In case of boolean 1 equals true and 0 equals false.

425  
426  
427  
428

Table 15 shows all association ends of GenericValueTimePoint with other classes.

**Table 15 – Association ends of RemedialActionScheduleProfile::GenericValueTimePoint with other classes**

mult from	name	mult to	type	description
1..*	GenericValueSchedule	1..1	<a href="#">GenericValueSchedule</a>	(NC) Time series the time point values belongs to.

429

### 430 3.12 (abstract,NC) GridStateAlteration

431 Inheritance path = [IdentifiedObject](#)

432 Grid state alteration is a change of values describing state (operating point) of one element in the grid model compared to the base case.

434 Table 16 shows all attributes of GridStateAlteration.

435 **Table 16 – Attributes of RemedialActionScheduleProfile::GridStateAlteration**

name	mult	type	description
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

436

### 437 3.13 (NC) GridStateIntensitySchedule

438 Inheritance path = [GenericValueSchedule](#) : [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

440 Defines the intensity applied for a given grid state alteration. It is primarily used in exchanges related to the remedial action schedule. The value provided by the schedule replaces the value of the attribute to which the schedule refers to.

443 Table 17 shows all attributes of GridStateIntensitySchedule.

444 **Table 17 – Attributes of RemedialActionScheduleProfile::GridStateIntensitySchedule**

name	mult	type	description
valueKind	0..1	<a href="#">ValueOffsetKind</a>	(NC) The kind of value1 and value2 of the associated IrregularIntervalSchedule.
interpolationKind	1..1	<a href="#">TimeSeriesInterpolationKind</a>	inherited from: <a href="#">BaseTimeSeries</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

445

446 Table 18 shows all association ends of GridStateIntensitySchedule with other classes.

447 **Table 18 – Association ends of RemedialActionScheduleProfile::GridStateIntensitySchedule with other classes**

mult from	name	mult to	type	description
0..*	GridStateAlteration	1..1	<a href="#">GridStateAlteration</a>	(NC) The grid state alteration which has intensity.
0..*	RemedialActionSchedule	0..1	<a href="#">RemedialActionSchedule</a>	(NC) inherited from: <a href="#">GenericValueSchedule</a>



449

450 **3.14 (abstract) IdentifiedObject root class**451 This is a root class to provide common identification for all classes needing identification and  
452 naming attributes.

453 Table 19 shows all attributes of IdentifiedObject.

454 **Table 19 – Attributes of RemedialActionScheduleProfile::IdentifiedObject**

name	mult	type	description
description	0..1	<a href="#">String</a>	The description is a free human readable text describing or naming the object. It may be non unique and may not correlate to a naming hierarchy.
mRID	1..1	<a href="#">String</a>	Master resource identifier issued by a model authority. The mRID is unique within an exchange context. Global uniqueness is easily achieved by using a UUID, as specified in RFC 4122, for the mRID. The use of UUID is strongly recommended.  For CIMXML data files in RDF syntax conforming to IEC 61970-552, the mRID is mapped to rdf:ID or rdf:about attributes that identify CIM object elements.
name	0..1	<a href="#">String</a>	The name is any free human readable and possibly non unique text naming the object.

455

456 **3.15 (abstract,NC) PowerBidSchedule**457 Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)458 Power bid or offer related to a redispatch or countertrading measures. In the case of market  
459 place for economic efficiency of the bids and offers, this is equivalent to BidTimeSeries class  
460 in 62325 package.

461 Table 20 shows all attributes of PowerBidSchedule.

462 **Table 20 – Attributes of RemedialActionScheduleProfile::PowerBidSchedule**

name	mult	type	description
interpolationKind	1..1	<a href="#">TimeSeriesInterpolationKind</a>	inherited from: <a href="#">BaseTimeSeries</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

463

464 **3.16 (NC) PowerSchedule**465 Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

466 Time series represent irregular power, active and reactive, values at given points in time.

467 Table 21 shows all attributes of PowerSchedule.

468 **Table 21 – Attributes of RemedialActionScheduleProfile::PowerSchedule**

name	mult	type	description
interpolationKind	1..1	<a href="#">TimeSeriesInterpolationKind</a>	inherited from: <a href="#">BaseTimeSeries</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

name	mult	type	description
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

469

470 **3.17 (abstract,NC) PowerScheduleAction**471 Inheritance path = [IdentifiedObject](#)

472 Power schedule action is an action to rearrange power schedules.

473 Table 22 shows all attributes of PowerScheduleAction.

474 **Table 22 – Attributes of RemedialActionScheduleProfile::PowerScheduleAction**

name	mult	type	description
currency	0..1	<a href="#">Currency</a>	(NC) Currency the energy price is given in.
energyPrice	0..1	<a href="#">Decimal</a>	(NC) Energy price for the power schedule action.
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

475

476 Table 23 shows all association ends of PowerScheduleAction with other classes.

477 **Table 23 – Association ends of RemedialActionScheduleProfile::PowerScheduleAction**  
478 **with other classes**

mult from	name	mult to	type	description
0..1	PowerBidSchedule	0..1	<a href="#">PowerBidSchedule</a>	(NC) The power bid schedule which contains the power schedule action.
0..*	RemedialActionSchedule	1..1	<a href="#">RemedialActionSchedule</a>	(NC) Remedial action schedule which power schedule actions.
0..1	PowerSchedule	1..1	<a href="#">PowerSchedule</a>	(NC) Power schedule which contains the power schedule action.

479

480 **3.18 (NC) PowerTimePoint root class**

481 Power, active and reactive, value at a given point in time.

482 Table 24 shows all attributes of PowerTimePoint.

483 **Table 24 – Attributes of RemedialActionScheduleProfile::PowerTimePoint**

name	mult	type	description
atTime	1..1	<a href="#">DateTime</a>	(NC) The time the data is valid for.
p	0..1	<a href="#">ActivePower</a>	(NC) Active power injection. Load sign convention is used, i.e. positive sign means flow out from a node.
q	0..1	<a href="#">ReactivePower</a>	(NC) Reactive power injection. Load sign convention is used, i.e. positive sign means flow out from a node.
price	0..1	<a href="#">Decimal</a>	(NC) Price for the scheduled active power per unit of active power. e.g. per MW.
activatedP	0..1	<a href="#">ActivePower</a>	(NC) Active power activated as part of redispatch. Negative number means that the value is scheduling down. Positive number means that the value is scheduling up.
activatedPrice	0..1	<a href="#">Decimal</a>	(NC) Price for the activated active power per unit e.g. per MW.

484

485 Table 25 shows all association ends of PowerTimePoint with other classes.

486 **Table 25 – Association ends of RemedialActionScheduleProfile::PowerTimePoint with**  
487 **other classes**

mult from	name	mult to	type	description
1..*	PowerSchedule	1..1	<a href="#">PowerSchedule</a>	(NC) Time series the time point values belongs to.

488

489 **3.19 (NC) ProposingRemedialActionScheduleShare root class**490 Proposing entity (System Operator) with a proper cost share for a given remedial action  
491 schedule.

492 Table 26 shows all attributes of ProposingRemedialActionScheduleShare.

493 **Table 26 – Attributes of**  
494 **RemedialActionScheduleProfile::ProposingRemedialActionScheduleShare**

name	mult	type	description
costSharingFactor	0..1	<a href="#">Decimal</a>	(NC) Sharing factor of the cost of the remedial action as a fraction of the total cost, i.e. system operator's cost = cost x (costSharingFactor / sum of all costSharingFactor).
mRID	0..1	<a href="#">String</a>	(NC) Master resource identifier issued by a model authority. The mRID is unique within an exchange context. Global uniqueness is easily achieved by using a UUID, as specified in RFC 4122, for the mRID. The use of UUID is strongly recommended.  For CIMXML data files in RDF syntax conforming to IEC 61970-552, the mRID is mapped to rdf:ID or rdf:about attributes that identify CIM object elements.

495

496 Table 27 shows all association ends of ProposingRemedialActionScheduleShare with other  
497 classes.498 **Table 27 – Association ends of**  
499 **RemedialActionScheduleProfile::ProposingRemedialActionScheduleShare with other**  
500 **classes**

mult from	name	mult to	type	description
0..*	RemedialActionSchedule	1..1	<a href="#">RemedialActionSchedule</a>	(NC) Remedial action schedule proposed by the proposing entity.
0..*	ProposingEntity	1..1	<a href="#">SystemOperator</a>	(NC) Proposing entity making the proposing remedial action schedule share.

501

502 **3.20 (NC) RedispatchScheduleAction**503 Inheritance path = [PowerScheduleAction](#) : [IdentifiedObject](#)504 Redispatch schedule action is an action to rearrange power schedules for a scheduled resource  
505 to obtain a feasible and secure operational state of the power electricity system.

506 Table 28 shows all attributes of RedispatchScheduleAction.

507 **Table 28 – Attributes of RemedialActionScheduleProfile::RedispatchScheduleAction**

name	mult	type	description
currency	0..1	<a href="#">Currency</a>	(NC) inherited from: <a href="#">PowerScheduleAction</a>
energyPrice	0..1	<a href="#">Decimal</a>	(NC) inherited from: <a href="#">PowerScheduleAction</a>
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

508

509 Table 29 shows all association ends of RedispatchScheduleAction with other classes.

510

511

**Table 29 – Association ends of RemedialActionScheduleProfile::RedispatchScheduleAction with other classes**

mult from	name	mult to	type	description
0..*	ScheduleResource	0..1	<a href="#">ScheduleResource</a>	(NC) The schedule resource that has this redispatch action.
0..1	PowerBidSchedule	0..1	<a href="#">PowerBidSchedule</a>	(NC) inherited from: <a href="#">PowerScheduleAction</a>
0..*	RemedialActionSchedule	1..1	<a href="#">RemedialActionSchedule</a>	(NC) inherited from: <a href="#">PowerScheduleAction</a>
0..1	PowerSchedule	1..1	<a href="#">PowerSchedule</a>	(NC) inherited from: <a href="#">PowerScheduleAction</a>

512

**3.21 (abstract,NC) RemedialAction**514 Inheritance path = [IdentifiedObject](#)515 Remedial action describes one or more actions that can be performed on a given power system  
516 model situation to eliminate one or more identified breaches of constraints. The remedial action  
517 can be costly, and have a cost characteristic, or non costly.

518 Table 30 shows all attributes of RemedialAction.

519

**Table 30 – Attributes of RemedialActionScheduleProfile::RemedialAction**

name	mult	type	description
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

520

**3.22 (NC) RemedialActionCost root class**

522 Remedial action cost is the total cost itemised cost by category and type for the remedial action.

523 Table 31 shows all attributes of RemedialActionCost.

524

**Table 31 – Attributes of RemedialActionScheduleProfile::RemedialActionCost**

name	mult	type	description
costAllocationTime	0..1	<a href="#">DateTime</a>	(NC) Cost allocation time is the time the cost shall be allocated.
kind	1..1	<a href="#">CostSettledKind</a>	(NC) Remedial action cost category related to the confirmation of the cost in regards to changes.

name	mult	type	description
operationalCost	0..1	<a href="#">Decimal</a>	(NC) Operational cost is the total cost directly related to operate the unit according to the remedial action, e.g. fuel cost.
opportunityCost	0..1	<a href="#">Decimal</a>	(NC) Opportunity cost is the total cost of potential earning that is missed due to performing the remedial action.
otherCost	0..1	<a href="#">Decimal</a>	(NC) Other cost is the total cost that cannot be directly allocated to any of the other items.
processingFee	0..1	<a href="#">Decimal</a>	(NC) Processing fee is the total cost for processing the remedial action.
savedFuelCost	0..1	<a href="#">Decimal</a>	(NC) Saved fuel cost is the total saving due to not consuming the expected fuel as part of the remedial action.
shutdownCost	0..1	<a href="#">Decimal</a>	(NC) Shutdown cost is the total cost for shutting down a unit as part of the remedial action.
startupCost	0..1	<a href="#">Decimal</a>	(NC) Start-up cost is the total cost for activating the remedial action, e.g. if a generator needs to be started before it can perform the remedial action.
mRID	1..1	<a href="#">String</a>	(NC) Master resource identifier issued by a model authority. The mRID is unique within an exchange context. Global uniqueness is easily achieved by using a UUID, as specified in RFC 4122, for the mRID. The use of UUID is strongly recommended.  For CIMXML data files in RDF syntax conforming to IEC 61970-552, the mRID is mapped to rdf:ID or rdf:about attributes that identify CIM object elements.

525

526

Table 32 shows all association ends of RemedialActionCost with other classes.

527

**Table 32 – Association ends of RemedialActionScheduleProfile::RemedialActionCost with other classes**

528

mult from	name	mult to	type	description
0..*	RemedialActionSchedule	1..1	<a href="#">RemedialActionSchedule</a>	(NC) Remedial action schedule for which this remedial action cost relates to.

529

530

### 3.23 (NC) RemedialActionSchedule

531

Inheritance path = [IdentifiedObject](#)

532

A schedule for a determined remedial action.

533

Table 33 shows all attributes of RemedialActionSchedule.

534

**Table 33 – Attributes of RemedialActionScheduleProfile::RemedialActionSchedule**

name	mult	type	description
statusKind	1..1	<a href="#">RemedialActionScheduleStatusKind</a>	(NC) Indicates the status kind for the remedial action schedule.
statusReason	0..1	<a href="#">String</a>	(NC) Description of reasoning for the status. For instance, in case of rejected remedial action, the reason for this rejection is described here.
totalCostCurrency	0..1	<a href="#">Currency</a>	(NC) The currency of the total cost.
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

name	mult	type	description
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

535

536

Table 34 shows all association ends of RemedialActionSchedule with other classes.

537

538

**Table 34 – Association ends of RemedialActionScheduleProfile::RemedialActionSchedule with other classes**

mult from	name	mult to	type	description
0..*	Contingency	0..1	<a href="#">Contingency</a>	(NC) The contingency for a curative remedial action schedule.
0..*	RemedialAction	1..1	<a href="#">RemedialAction</a>	(NC) The remedial action that has a remedial action schedule associated.
0..*	ProposingEntity	0..1	<a href="#">SecurityCoordinator</a>	(NC) The security coordinator that is proposing this remedial action schedule.
0..*	AssignedRegion	0..1	<a href="#">Region</a>	(NC) The assigned region for this remedial action schedule.
0..*	RemedialActionScheduleGroup	0..1	<a href="#">RemedialActionScheduleGroup</a>	(NC) Remedial action schedule group in which the remedial action schedule is allocated.

539

540

### 3.24 (NC) RemedialActionScheduleAcceptance root class

541

It identifies if the remedial action schedule is accepted for a given system operator.

542

Table 35 shows all attributes of RemedialActionScheduleAcceptance.

543

544

**Table 35 – Attributes of RemedialActionScheduleProfile::RemedialActionScheduleAcceptance**

name	mult	type	description
kind	1..1	<a href="#">RemedialActionScheduleAcceptanceKind</a>	(NC) The kind of the remedial action acceptance.
mRID	1..1	<a href="#">String</a>	(NC) Master resource identifier issued by a model authority. The mRID is unique within an exchange context. Global uniqueness is easily achieved by using a UUID, as specified in RFC 4122, for the mRID. The use of UUID is strongly recommended.  For CIMXML data files in RDF syntax conforming to IEC 61970-552, the mRID is mapped to rdf:ID or rdf:about attributes that identify CIM object elements.

545

546

Table 36 shows all association ends of RemedialActionScheduleAcceptance with other classes.

547

548

549

**Table 36 – Association ends of RemedialActionScheduleProfile::RemedialActionScheduleAcceptance with other classes**

mult from	name	mult to	type	description
0..*	RemedialActionSchedule	1..1	<a href="#">RemedialActionSchedule</a>	(NC) A remedial action schedule for which a remedial action schedule acceptance is reported.

mult from	name	mult to	type	description
0..*	SystemOperator	1..1	<a href="#">SystemOperator</a>	(NC) A system operator for which a remedial action schedule acceptances are reported.

550

551 **3.25 (NC) RemedialActionScheduleGroup**552 Inheritance path = [IdentifiedObject](#)

553 Remedial action schedule group collects two or more remedial action schedules together. The  
554 remedial action schedule group needs to be set up for the same remedial action or proposing  
555 alternative remedial action by including a reference to another remedial action. All remedial  
556 actions in a group must have the same activation time.

557 Table 37 shows all attributes of RemedialActionScheduleGroup.

558

**Table 37 – Attributes of****RemedialActionScheduleProfile::RemedialActionScheduleGroup**

559

name	mult	type	description
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

560

561 **3.26 (NC,Description) RemedialActionScheme root class**

562 Remedial Action Scheme (RAS), Special Protection Schemes (SPS), System Protection  
563 Schemes (SPS) or System Integrity Protection Schemes (SIPS).

564 A Remedial Action Scheme consists of one or more stages that can trigger and execute a  
565 protection action.

566 Table 38 shows all attributes of RemedialActionScheme.

567

**Table 38 – Attributes of RemedialActionScheduleProfile::RemedialActionScheme**

name	mult	type	description
armed	1..1	<a href="#">Boolean</a>	(NC) Defines the arming status of the remedial action scheme. It is set by operation or by signal.

568

569 **3.27 (abstract,NC) Region root class**

570 A region where the system operator belongs to.

571 **3.28 (abstract,NC) ScheduleResource root class**

572 A schedule resource is a market-based method for handling participation of small units,  
573 particularly located on the lower voltage level that is controlled by a Distributed System  
574 Operator (DSO). It is a collection of units that can operate in the market by providing bids, offers  
575 and a resulting committed operational schedule for the collection.

576 **3.29 (NC,Description) SchemeRemedialAction**577 Inheritance path = [RemedialAction](#) : [IdentifiedObject](#)

578 Scheme remedial action is remedial action that involves a scheme that can include conditional  
579 logic and stages of grid alteration. The primary remedial action is the arming of these schemes,  
580 that will then perform curative remedial action when the condition is met. System Integrity  
581 Protection Scheme (SIPS) and Special Protection Scheme (SPS) are example of this.

582 Table 39 shows all attributes of SchemeRemedialAction.

583 **Table 39 – Attributes of RemedialActionScheduleProfile::SchemeRemedialAction**

name	mult	type	description
description	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
mRID	1..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>
name	0..1	<a href="#">String</a>	inherited from: <a href="#">IdentifiedObject</a>

584

585 Table 40 shows all association ends of SchemeRemedialAction with other classes.

586 **Table 40 – Association ends of RemedialActionScheduleProfile::SchemeRemedialAction**  
587 **with other classes**

mult from	name	mult to	type	description
0..1	RemedialActionScheme	1..1	<a href="#">RemedialActionScheme</a>	(NC) Remedial action scheme that has this armed remedial action.

588

589 **3.30 (abstract,NC) SecurityCoordinator root class**590 A role that coordinates the relevant remedial actions and their optimisation to ensure efficient  
591 use to achieve required operational security of the power system.592 **3.31 (abstract,NC) SystemOperator root class**

593 System operator.

594 **3.32 (NC) CostSettledKind enumeration**

595 Kind describing how settled the cost is in regards to changes.

596 Table 41 shows all literals of CostSettledKind.

597 **Table 41 – Literals of RemedialActionScheduleProfile::CostSettledKind**

literal	value	description
indicative		Indicative cost.
provisional		Provisional cost.
final		Final cost. For instance, the cost is not expected to be changed on a later stage.

598

599 **3.33 (NC) RemedialActionScheduleAcceptanceKind enumeration**

600 The kind of acceptance for a remedial action schedule.

601 Table 42 shows all literals of RemedialActionScheduleAcceptanceKind.

602 **Table 42 – Literals of**  
603 **RemedialActionScheduleProfile::RemedialActionScheduleAcceptanceKind**

literal	value	description
accepted		The acceptance of remedial action schedule is concluded and accepted.
refused		The acceptance of the remedial action schedule is concluded and refused.
waiting		The acceptance of the remedial action schedule is waiting (in progress).
timeout		The acceptance of the remedial action schedule was not completed due to timeout.

604



605 **3.34 (NC) TimeSeriesInterpolationKind enumeration**

606 Kinds of interpolation of values between two time point.

607 Table 43 shows all literals of TimeSeriesInterpolationKind.

608 **Table 43 – Literals of RemedialActionScheduleProfile::TimeSeriesInterpolationKind**

literal	value	description
none		No interpolation is applied.
next		The value between two time points is set to next value.

609

610 **3.35 (NC) RemedialActionScheduleStatusKind enumeration**

611 Remedial action schedule status kinds.

612 Table 44 shows all literals of RemedialActionScheduleStatusKind.

613

614

**Table 44 – Literals of  
RemedialActionScheduleProfile::RemedialActionScheduleStatusKind**

literal	value	description
proposed		Proposed remedial action schedule.
agreed		Agreed remedial action schedule.
rejected		Rejected remedial action schedule.
ordered		Ordered remedial action schedule.
previouslyAgreed		Previously agreed remedial action schedule.
notUsed		Not used remedial action schedule.
agreementValidated		The agreement is validated for the remedial action schedule.
rejectionValidated		The rejection is validated for the remedial action schedule.
implemented		An ordered remedial action is implemented.
activated		Activated remedial action schedule.

615

616 **3.36 Currency enumeration**

617 Monetary currencies. ISO 4217 standard including 3-character currency code.

618 Table 45 shows all literals of Currency.

619

**Table 45 – Literals of RemedialActionScheduleProfile::Currency**

literal	value	description
AED	784	United Arab Emirates dirham.
AFN	971	Afghan afghani.
ALL	008	Albanian lek.
AMD	051	Armenian dram.
ANG	532	Netherlands Antillean guilder.
AOA	973	Angolan kwanza.
ARS	032	Argentine peso.
AUD	036	Australian dollar.
AWG	533	Aruban florin.
AZN	944	Azerbaijani manat.

literal	value	description
BAM	977	Bosnia and Herzegovina convertible mark.
BBD	052	Barbados dollar.
BDT	050	Bangladeshi taka.
BGN	975	Bulgarian lev.
BHD	048	Bahraini dinar.
BIF	108	Burundian franc.
BMD	060	Bermudian dollar (customarily known as Bermuda dollar).
BND	096	Brunei dollar.
BOB	068	Boliviano.
BOV	984	Bolivian Mvdol (funds code).
BRL	986	Brazilian real.
BSD	044	Bahamian dollar.
BTN	064	Bhutanese ngultrum.
BWP	072	Botswana pula.
BYR	974	Belarusian ruble.
BZD	084	Belize dollar.
CAD	124	Canadian dollar.
CDF	976	Congolese franc.
CHF	756	Swiss franc.
CLF	990	Unidad de Fomento (funds code), Chile.
CLP	152	Chilean peso.
CNY	156	Chinese yuan.
COP	170	Colombian peso.
COU	970	Unidad de Valor Real.
CRC	188	Costa Rican colon.
CUC	931	Cuban convertible peso.
CUP	192	Cuban peso.
CVE	132	Cape Verde escudo.
CZK	203	Czech koruna.
DJF	262	Djiboutian franc.
DKK	208	Danish krone.
DOP	214	Dominican peso.
DZD	012	Algerian dinar.
EEK	233	Estonian kroon.
EGP	818	Egyptian pound.
ERN	232	Eritrean nakfa.
ETB	230	Ethiopian birr.
EUR	978	Euro.
FJD	242	Fiji dollar.
FKP	238	Falkland Islands pound.

literal	value	description
GBP	826	Pound sterling.
GEL	981	Georgian lari.
GHS	936	Ghanaian cedi.
GIP	929	Gibraltar pound.
GMD	270	Gambian dalasi.
GNF	324	Guinean franc.
GTQ	320	Guatemalan quetzal.
GYD	328	Guyanese dollar.
HKD	344	Hong Kong dollar.
HNL	340	Honduran lempira.
HRK	191	Croatian kuna.
HTG	332	Haitian gourde.
HUF	348	Hungarian forint.
IDR	360	Indonesian rupiah.
ILS	376	Israeli new sheqel.
INR	356	Indian rupee.
IQD	368	Iraqi dinar.
IRR	364	Iranian rial.
ISK	352	Icelandic króna.
JMD	388	Jamaican dollar.
JOD	400	Jordanian dinar.
JPY	392	Japanese yen.
KES	404	Kenyan shilling.
KGS	417	Kyrgyzstani som.
KHR	116	Cambodian riel.
KMF	174	Comoro franc.
KPW	408	North Korean won.
KRW	410	South Korean won.
KWD	414	Kuwaiti dinar.
KYD	136	Cayman Islands dollar.
KZT	398	Kazakhstani tenge.
LAK	418	Lao kip.
LBP	422	Lebanese pound.
LKR	144	Sri Lanka rupee.
LRD	430	Liberian dollar.
LSL	426	Lesotho loti.
LTL	440	Lithuanian litas.
LVL	428	Latvian lats.
LYD	434	Libyan dinar.
MAD	504	Moroccan dirham.
MDL	498	Moldovan leu.

literal	value	description
MGA	969	Malagasy ariary.
MKD	807	Macedonian denar.
MMK	104	Myanma kyat.
MNT	496	Mongolian tugrik.
MOP	446	Macanese pataca.
MRO	478	Mauritanian ouguiya.
MUR	480	Mauritian rupee.
MVR	462	Maldivian rufiyaa.
MWK	454	Malawian kwacha.
MXN	484	Mexican peso.
MYR	458	Malaysian ringgit.
MZN	943	Mozambican metical.
NAD	516	Namibian dollar.
NGN	566	Nigerian naira.
NIO	558	Cordoba oro.
NOK	578	Norwegian krone.
NPR	524	Nepalese rupee.
NZD	554	New Zealand dollar.
OMR	512	Omani rial.
PAB	590	Panamanian balboa.
PEN	604	Peruvian nuevo sol.
PGK	598	Papua New Guinean kina.
PHP	608	Philippine peso.
PKR	586	Pakistani rupee.
PLN	985	Polish zloty.
PYG	600	Paraguayan guaraní.
QAR	634	Qatari rial.
RON	946	Romanian new leu.
RSD	941	Serbian dinar.
RUB	643	Russian rouble.
RWF	646	Rwandan franc.
SAR	682	Saudi riyal.
SBD	090	Solomon Islands dollar.
SCR	690	Seychelles rupee.
SDG	938	Sudanese pound.
SEK	752	Swedish krona/kronor.
SGD	702	Singapore dollar.
SHP	654	Saint Helena pound.
SLL	694	Sierra Leonean leone.
SOS	706	Somali shilling.
SRD	968	Surinamese dollar.

literal	value	description
STD	678	São Tomé and Príncipe dobra.
SYP	760	Syrian pound.
SZL	748	Lilangeni.
THB	764	Thai baht.
TJS	972	Tajikistani somoni.
TMT	934	Turkmenistani manat.
TND	788	Tunisian dinar.
TOP	776	Tongan pa'anga.
TRY	949	Turkish lira.
TTD	780	Trinidad and Tobago dollar.
TWD	901	New Taiwan dollar.
TZS	834	Tanzanian shilling.
UAH	980	Ukrainian hryvnia.
UGX	800	Ugandan shilling.
USD	840	United States dollar.
UYU	858	Uruguayan peso.
UZS	860	Uzbekistan som.
VEF	937	Venezuelan bolívar fuerte.
VND	704	Vietnamese Dong.
VUV	548	Vanuatu vatu.
WST	882	Samoan tala.
XAF	950	CFA franc BEAC.
XCD	951	East Caribbean dollar.
XOF	952	CFA Franc BCEAO.
XPF	953	CFP franc.
YER	886	Yemeni rial.
ZAR	710	South African rand.
ZMK	894	Zambian kwacha.
ZWL	932	Zimbabwe dollar.

620

### 621 3.37 UnitMultiplier enumeration

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

626 For example, if a unit symbol is "m2Pers" and the multiplier is "k", then the value is  $k(m^{**2}/s)$ ,  
627 and the multiplier applies to the entire final value, not to any individual part of the value. This  
628 can be conceptualized by substituting a derived unit symbol for the unit type. If one imagines  
629 that the symbol "P" represents the derived unit "m2Pers", then applying the multiplier "k" can  
630 be conceptualized simply as "kP".

631 For example, the SI unit for mass is "kg" and not "g". If the unit symbol is defined as "kg", then  
632 the multiplier is applied to "kg" as a whole and does not replace the "k" in front of the "g". In  
633 this case, the multiplier of "m" would be used with the unit symbol of "kg" to represent one gram.  
634 As a text string, this violates the instructions in IEC 80000-1. However, because the unit symbol  
635 in CIM is treated as a derived unit instead of as an SI unit, it makes more sense to conceptualize

636 the "kg" as if it were replaced by one of the proposed replacements for the SI mass symbol. If  
 637 one imagines that the "kg" were replaced by a symbol "P", then it is easier to conceptualize the  
 638 multiplier "m" as creating the proper unit "mP", and not the forbidden unit "mkg".  
 639 Table 46 shows all literals of UnitMultiplier.

640 **Table 46 – Literals of RemedialActionScheduleProfile::UnitMultiplier**

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

641

### 642 3.38 UnitSymbol enumeration

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

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

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

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

664 The integer values are used for harmonization with IEC 61850.

665 Table 47 shows all literals of UnitSymbol.

666 **Table 47 – Literals of RemedialActionScheduleProfile::UnitSymbol**

literal	value	description
s	4	Time in seconds.
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 $VI\cos(\phi)$ ), is expressed in Watts. See also apparent power and reactive power.
VAr	63	Reactive power in volt amperes reactive. The "reactive" or "imaginary" component of electrical power ( $VI\sin(\phi)$ ). (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.
Wh	72	Real energy in watt hours.

667

668 **3.39 (NC) ValueOffsetKind enumeration**

669 The kind of the value offset.

670 Table 48 shows all literals of ValueOffsetKind.

671 **Table 48 – Literals of RemedialActionScheduleProfile::ValueOffsetKind**

literal	value	description
absolute		Value of the range constraint is replacing the attribute value referenced by the PropertyReference in a determined operational scenario.
incremental		Value of the range constraint is incrementing the attribute value referenced by the PropertyReference in a determined operational scenario.
incrementalPercentage		Value of the range constraint is incrementing in percentage the attribute value referenced by the PropertyReference in a determined operational scenario.

672

673 **3.40 ActivePower datatype**674 Product of RMS value of the voltage and the RMS value of the in-phase component of the  
675 current.

676 Table 49 shows all attributes of ActivePower.

677 **Table 49 – Attributes of RemedialActionScheduleProfile::ActivePower**

name	mult	type	description
multiplier	0..1	<a href="#">UnitMultiplier</a>	(const=M)
unit	0..1	<a href="#">UnitSymbol</a>	(const=W)
value	0..1	<a href="#">Float</a>	

678

679 **3.41 RealEnergy datatype**

680 Real electrical energy.

681 Table 50 shows all attributes of RealEnergy.

682 **Table 50 – Attributes of RemedialActionScheduleProfile::RealEnergy**

name	mult	type	description
multiplier	0..1	<a href="#">UnitMultiplier</a>	(const=M)
unit	0..1	<a href="#">UnitSymbol</a>	(const=Wh)
value	0..1	<a href="#">Float</a>	

683

684 **3.42 ReactivePower datatype**685 Product of RMS value of the voltage and the RMS value of the quadrature component of the  
686 current.

687 Table 51 shows all attributes of ReactivePower.

688 **Table 51 – Attributes of RemedialActionScheduleProfile::ReactivePower**

name	mult	type	description
value	0..1	<a href="#">Float</a>	

name	mult	type	description
unit	0..1	<a href="#">UnitSymbol</a>	(const=VAr)
multiplier	0..1	<a href="#">UnitMultiplier</a>	(const=M)

689

690 **3.43 Seconds datatype**

691 Time, in seconds.

692 Table 52 shows all attributes of Seconds.

693

**Table 52 – Attributes of RemedialActionScheduleProfile::Seconds**

name	mult	type	description
value	0..1	<a href="#">Float</a>	Time, in seconds
unit	0..1	<a href="#">UnitSymbol</a>	(const=s)
multiplier	0..1	<a href="#">UnitMultiplier</a>	(const=none)

694

695 **3.44 Boolean primitive**

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

697 **3.45 Integer primitive**

698 An integer number. The range is unspecified and not limited.

699 **3.46 DateTime primitive**

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

704 **3.47 Duration primitive**

705 Duration as "PnYnMnDTnHnMnS" which conforms to ISO 8601, where nY expresses a number  
 706 of years, nM a number of months, nD a number of days. The letter T separates the date  
 707 expression from the time expression and, after it, nH identifies a number of hours, nM a number  
 708 of minutes and nS a number of seconds. The number of seconds could be expressed as a  
 709 decimal number, but all other numbers are integers.

710 **3.48 Decimal primitive**

711 Decimal is the base-10 notational system for representing real numbers.

712 **3.49 Float primitive**

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

714 **3.50 String primitive**

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

717

718



719

## **Annex A (informative): Sample data**

### **720 A.1 General**

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

### **725 A.2 Sample instance data**

726 Test data files are available in the CIM EG SharePoint.

727