**ภาคผวก A07  
โปรไฟล์เพื่อการเชื่อมโยงข้อมูล WMS\_OMS**

การพัฒนาเชื่อมโยงข้อมูลระหว่างซอฟต์แวร์จำเป็นต้องมีข้อกำหนดกลางเพื่อการเชื่อมโยงข้อมูล มาตรฐาน ไออีซี ซิม หรือ IEC CIM (Common Information Model) เป็นมาตรฐานสากลเพื่อการเชื่อมโยงข้อมูลเกี่ยวกับ การจำหน่ายกระแสไฟฟ้าและการบริหารไฟฟ้าขัดข้อง ที่สำคัญได้แก่ IEC-61970 และ IEC-61968 มาตรฐานสากลดังกล่าวจัดทำขึ้นเพื่อใช้เป็นข้อกำหนดกลางในการรับส่งข้อมูลระหว่างซอฟต์แวร์ที่แตกต่างกัน เพื่อลดเวลา ลดค่าใช้จ่าย และเพิ่มประสิทธิภาพในการพัฒนาเชื่อมโยงข้อมูลระหว่างกัน ปัจจุบันผลิตภัณฑ์ซอฟต์แวร์ที่พัฒนาขึ้นเพื่อสนับสนุนการปฏิบัติระบบไฟฟ้าและบริหารไฟฟ้าขัดข้อง มักมีความสามารถในการเชื่อมโยงข้อมูลตามมาตรฐานนี้

โปรไฟล์เพื่อการเชื่อมโยงข้อมูล (CIM Profile) คือ ข้อกำหนดขอบเขตและคุณลักษณะเฉพาะของข้อมูลภายใต้บริบทหนึ่ง ประกอบด้วย ชื่อข้อมูล ความหมายและรูปแบบข้อมูล เพื่อใช้ในการพัฒนาระบบเชื่อมโยงข้อมูลภายใต้วัตถุประสงค์หนึ่ง ตัวอย่างโปรไฟล์มาตรฐาน ได้แก่ IEC-61970-452, IEC-61970-453, IEC-61970-456 องค์กรสามารถกำหนดโปรไฟล์ที่เหมาะสมกับบริบทของตนได้ โดยการกำหนดรายการข้อมูลเฉพาะส่วนที่จำเป็นสำหรับการเชื่อมโยงข้อมูลภายใต้บริบทนั้น มักมีขนาดเล็กและง่ายต่อการพัฒนา โปรไฟล์การเชื่อมโยงข้อมูลนี้จัดทำขึ้นตามมาตรฐานสากล IEC-61970-501 จัดทำขึ้นโดยใช้ซอฟต์แวร์เครื่องมือเพื่อใช้สร้างโปรไฟล์ อาทิ เช่น CIMtool เป็นต้น

เอกสารนี้อธิบายโปรไฟล์เพื่อการเชื่อมโยง ระบบสั่งงาน ชื่อว่า WMS\_OMS หรือเนมสเปส ชื่อเต็มว่า

CIM profile: [http://pea.co.th/cim/profile/WMS\_OMS#](http://pea.co.th/cim/profile/WMS_OMS)

ประกอบด้วย เอกสารดังนี้

1. เอกสารอธิบายโปรไฟล์ : WMS\_OMS.rtf, WMS\_OMS.html
2. แฟ้มเอกสารอิเล็กทรอนิกส์ ข้อกำหนดโปรไฟล์ : WMS\_OMS.owl
3. แฟ้มเอกสารอิเล็กทรอนิกส์ IEC-61970-501 : WMS\_OMS.legacy-rdfs
4. แฟ้มเอกสารอิเล็กทรอนิกส์ IEC-61968-100 : WMS\_OMS.part100-ed2.xsd

ผู้รับจ้างต้องดำเนินการศึกษา ทบทวนและสอบทาน ข้อกำหนดโปรไฟลน์นี้ กับผู้ที่เกี่ยวข้องกับซอฟต์แวร์ที่จะเชื่อมโยงนั้น ปรับข้อกำหนดโปรไฟล์ให้สอดคล้องกับความต้องการของผู้เกี่ยวข้องและเสนอขอรับความเห็นชอบก่อนการดำเนินการ

**WMS\_OMS\_Profile**

Profile namespace: http://pea.co.th/cim/profile/WMS\_OMS#

**Concrete Classes**

**ActivityRecord**

Records activity for an entity at a point in time; activity may be for an event that has already occurred or for a planned activity.

**Native Members**

|  |  |  |  |
| --- | --- | --- | --- |
| **name** | **mult** | **type** | **description** |
| mRID | 1..1 | string | 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. |
| createdDateTime | 1..1 | dateTime | Date and time this activity record has been created (different from the 'status.dateTime', which is the time of a status change of the associated object, if applicable). |
| description | 1..1 | string | 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. |
| name | 1..1 | string | The name is any free human readable and possibly non unique text naming the object. |
| reason | 1..1 | string | Reason for event resulting in this activity record, typically supplied when user initiated. |
| severity | 1..1 | string | Severity level of event resulting in this activity record. |
| type | 1..1 | string | Type of event resulting in this activity record. |

**Crew**

Group of people with specific skills, tools, and vehicles.

**Native Members**

|  |  |  |  |
| --- | --- | --- | --- |
| **name** | **mult** | **type** | **description** |
| mRID | 1..1 | string | 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. |
| description | 1..1 | string | 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. |
| name | 1..1 | string | The name is any free human readable and possibly non unique text naming the object. |
| CrewMembers | 1..\* | [CrewMember](#CrewMember) | All members of this crew. |
| CrewType | 1..1 | [CrewType](#CrewType) | Type of this crew. |
| status | 1..1 | [Status](#Status) | Status of this crew. |
| WorkAssets | 1..\* | [WorkAsset](#WorkAsset) | All work assets used by this crew. |
| WorkTasks | 1..\* | [WorkTask](#WorkTask) | All work tasks this crew participates in. |

**Fault**

Abnormal condition causing current flow through conducting equipment, such as caused by equipment failure or short circuits from objects not typically modelled (for example, a tree falling on a line).

**Native Members**

|  |  |  |  |
| --- | --- | --- | --- |
| **name** | **mult** | **type** | **description** |
| kind | 1..1 | [PhaseConnectedFaultKind](#PhaseConnectedFaultKind) | The kind of phase fault. |
| occurredDateTime | 1..1 | dateTime | The date and time at which the fault occurred. |
| phases | 1..1 | [PhaseCode](#PhaseCode) | The phases participating in the fault. The fault connections into these phases are further specified by the type of fault. |
| FaultCauseTypes | 1..\* | [FaultCauseType](#FaultCauseType) | All types of fault cause. |
| FaultyEquipment | 1..1 | [Equipment](#Equipment) | Equipment carrying this fault. |

**Outage**

Document describing details of an active or planned outage in a part of the electrical network.

A non-planned outage may be created upon:

- a breaker trip,

- a fault indicator status change,

- a meter event indicating customer outage,

- a reception of one or more customer trouble calls, or

- an operator command, reflecting information obtained from the field crew.

Outage restoration may be performed using a switching plan which complements the outage information with detailed switching activities, including the relationship to the crew and work.

A planned outage may be created upon:

- a request for service, maintenance or construction work in the field, or

- an operator-defined outage for what-if/contingency network analysis.

**Native Members**

| **name** | **mult** | **type** | **description** |
| --- | --- | --- | --- |
| cause | 0..1 | string | The cause of this outage. This is the cause that is used to present to external entities. That is, the cause is weather, equipment failure, etc.Note: At present, this is a free string text; it could be replaced with an enumeration in the future. |
| causeKind | 0..1 | [OutageCauseKind](#OutageCauseKind) | The possible cause that could be associated with this unplanned outage. |
| createdDateTime | 1..1 | dateTime | Date and time that this document was created. |
| customersRestored | 1..1 | integer | number of customers that have been restored in the area. |
| lastModifiedDateTime | 1..1 | dateTime | Date and time this document was last modified. Documents may potentially be modified many times during their lifetime. |
| metersAffected | 1..1 | integer | The updated number of meters affected by the outage as reported by the OMS within the utility. It is assumed this number will be updated repeatedly until the full outage is resolved. |
| originalCustomersServed | 1..1 | integer | the total number of customers that are served in the area (both outaged and not outaged). |
| originalMetersAffected | 1..1 | integer | The original number of meters that were affected as reported by the OMS within the utility. That is, this is the total number of meters that were out at the beginning of the outage. |
| outageKind | 1..1 | [OutageStatusKind](#OutageStatusKind) | Defines if the outage has been verified or is only estimated |
| reason | 0..1 | string | The reason for the planned outage. |
| reportedStartTime | 0..1 | dateTime | The earliest start time of the Outage - as reported by some system or individual |
| statusKind | 1..1 | [CrewStatusKind](#CrewStatusKind) | defines the status of the crew as in dispatched or arrived, etc. |
| subject | 1..1 | string | Document subject. |
| title | 1..1 | string | Document title. |
| type | 1..1 | string | Utility-specific classification of this document, according to its corporate standards, practices, and existing IT systems (e.g., for management of assets, maintenance, work, outage, customers, etc.). |
| ActivityRecord | 1..\* | [ActivityRecord](#ActivityRecord) | The activity record for a document |
| actualPeriod | 1..1 | [DateTimeInterval](#DateTimeInterval) | Actual outage period; end of the period corresponds to the actual restoration time. |
| DeEnergizedUsagePoint | 1..\* | [UsagePoint](#UsagePoint) | all deenergized useage points associated with the outage. |
| docStatus | 1..1 | [Status](#Status) | Status of this document. For status of subject matter this document represents (e.g., Agreement, Work), use 'status' attribute.Example values for 'docStatus.status' are draft, approved, cancelled, etc. |
| electronicAddress | 1..1 | [ElectronicAddress](#ElectronicAddress) | Electronic address. |
| EnergizedUsagePoint | 1..\* | [UsagePoint](#UsagePoint) | All energized usage points associated with this outage. |
| Equipments | 1..\* | [Equipment](#Equipment) | All equipments associated with this outage. |
| estimatedPeriod | 1..1 | [DateTimeInterval](#DateTimeInterval) | Estimated outage period for a planned outage. The start of the period is the start of the planned outage and the end of the period corresponds to the end of the planned outage. |
| Faults | 1..\* | [Fault](#Fault) | All faults involved in this outage. |
| FieldDispatchHistory | 0..1 | [FieldDispatchHistory](#FieldDispatchHistory) | The dispatch history associated with the unplanned outage |
| FieldDispatchHistory | 0..1 | [FieldDispatchHistory](#FieldDispatchHistory) | The dispatch history associated with the planned outage |
| Incident | 0..\* | [Incident](#Incident) | The incidents that are associated with the unplanned outage |
| Incident | 1..\* | [Incident](#Incident) | Incident reported in trouble call that results in this outage. |
| OutageArea | 1..\* | [OutageArea](#OutageArea) | The outage area where the outage occured. |
| OutageIsolationEquipment | 1..\* | [ConductingEquipment](#ConductingEquipment) | The equipment that isolates this outage |
| OutagePlan | 0..1 | [OutagePlan](#OutagePlan) | Outage plan for executing a planned outage. |
| PlannedSwitchActions | 1..\* | [SwitchAction](#SwitchAction) | All switch actions to apply within the scope of this planned outage. Each such action groups switches to which the action is to apply in order to produce the desired network state considered as outage. |
| status | 1..1 | [Status](#Status) | Status of subject matter (e.g., Agreement, Work) this document represents. For status of the document itself, use 'docStatus' attribute. |
| summary | 1..1 | [ServicePointOutageSummary](#ServicePointOutageSummary) | Summary counts of service points (customers) affected by this outage. |
| SwitchingPlans | 1..\* | [SwitchingPlan](#SwitchingPlan) | All switching plans that lead to supply restoration due to this outage. Only one will be retained for execution. |
| TroubleOrder | 0..\* | [TroubleOrder](#TroubleOrder) | The trouble order that is associated to the unplanned outage. |
| TroubleTicket | 0..\* | [TroubleTicket](#TroubleTicket) | The ticket called in by the customer that describes the trouble |

**OutageArea**

This defines the area covered by the Outage.

**Native Members**

|  |  |  |  |
| --- | --- | --- | --- |
| **name** | **mult** | **type** | **description** |
| earliestReportedTime | 1..1 | dateTime | This is the reported time of the first outage report |
| metersServed | 1..1 | integer | defines the number of meters served in the defined area. |
| outageAreaKind | 1..1 | [AreaKind](#AreaKind) | defines the type of area that has the outage - county, state, zipcode, etc. |

**OutagePlan**

Document containing the definition of planned outages of equipment and/or usage points. It will reference switching plans that are used to execute the planned outage.

**Native Members**

|  |  |  |  |
| --- | --- | --- | --- |
| **name** | **mult** | **type** | **description** |
| mRID | 1..1 | string | 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. |
| approvedDateTime | 1..1 | dateTime | The date and time the outage plan was approved |
| cancelledDateTime | 1..1 | dateTime | Date and Time the planned outage was canceled. |
| comment | 1..1 | string | Free text comment. |
| description | 1..1 | string | 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. |
| purpose | 1..1 | string | Purpose of this outage plan, such as whether it is to replace equipment or perform maintenance or repairs or to reconfigure network topology. |
| subject | 1..1 | string | Document subject. |
| title | 1..1 | string | Document title. |

**PlannedOutage**

**Native Members**

|  |  |  |  |
| --- | --- | --- | --- |
| **name** | **mult** | **type** | **description** |
| mRID | 1..1 | string | 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. |
| description | 1..1 | string | 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. |
| reason | 1..1 | string | The reason for the planned outage. |
| OutagePlan | 1..1 | [OutagePlan](#OutagePlan) | Outage plan for executing a planned outage. |

**Inherited Members**

| **name** | **mult** | **type** | **description** |
| --- | --- | --- | --- |
| cause | 0..1 | string | see [Outage](#Outage) |
| causeKind | 0..1 | [OutageCauseKind](#OutageCauseKind) | see [Outage](#Outage) |
| createdDateTime | 1..1 | dateTime | see [Outage](#Outage) |
| customersRestored | 1..1 | integer | see [Outage](#Outage) |
| lastModifiedDateTime | 1..1 | dateTime | see [Outage](#Outage) |
| metersAffected | 1..1 | integer | see [Outage](#Outage) |
| originalCustomersServed | 1..1 | integer | see [Outage](#Outage) |
| originalMetersAffected | 1..1 | integer | see [Outage](#Outage) |
| outageKind | 1..1 | [OutageStatusKind](#OutageStatusKind) | see [Outage](#Outage) |
| reason | 0..1 | string | see [Outage](#Outage) |
| reportedStartTime | 0..1 | dateTime | see [Outage](#Outage) |
| statusKind | 1..1 | [CrewStatusKind](#CrewStatusKind) | see [Outage](#Outage) |
| subject | 1..1 | string | see [Outage](#Outage) |
| title | 1..1 | string | see [Outage](#Outage) |
| type | 1..1 | string | see [Outage](#Outage) |
| ActivityRecord | 1..unbounded | [ActivityRecord](#ActivityRecord) | see [Outage](#Outage) |
| actualPeriod | 1..1 | [DateTimeInterval](#DateTimeInterval) | see [Outage](#Outage) |
| DeEnergizedUsagePoint | 1..unbounded | [UsagePoint](#UsagePoint) | see [Outage](#Outage) |
| docStatus | 1..1 | [Status](#Status) | see [Outage](#Outage) |
| electronicAddress | 1..1 | [ElectronicAddress](#ElectronicAddress) | see [Outage](#Outage) |
| EnergizedUsagePoint | 1..unbounded | [UsagePoint](#UsagePoint) | see [Outage](#Outage) |
| Equipments | 1..unbounded | [Equipment](#Equipment) | see [Outage](#Outage) |
| estimatedPeriod | 1..1 | [DateTimeInterval](#DateTimeInterval) | see [Outage](#Outage) |
| Faults | 1..unbounded | [Fault](#Fault) | see [Outage](#Outage) |
| FieldDispatchHistory | 0..1 | [FieldDispatchHistory](#FieldDispatchHistory) | see [Outage](#Outage) |
| FieldDispatchHistory | 0..1 | [FieldDispatchHistory](#FieldDispatchHistory) | see [Outage](#Outage) |
| Incident | 0..unbounded | [Incident](#Incident) | see [Outage](#Outage) |
| Incident | 1..unbounded | [Incident](#Incident) | see [Outage](#Outage) |
| OutageArea | 1..unbounded | [OutageArea](#OutageArea) | see [Outage](#Outage) |
| OutageIsolationEquipment | 1..unbounded | [ConductingEquipment](#ConductingEquipment) | see [Outage](#Outage) |
| OutagePlan | 0..1 | [OutagePlan](#OutagePlan) | see [Outage](#Outage) |
| PlannedSwitchActions | 1..unbounded | [SwitchAction](#SwitchAction) | see [Outage](#Outage) |
| status | 1..1 | [Status](#Status) | see [Outage](#Outage) |
| summary | 1..1 | [ServicePointOutageSummary](#ServicePointOutageSummary) | see [Outage](#Outage) |
| SwitchingPlans | 1..unbounded | [SwitchingPlan](#SwitchingPlan) | see [Outage](#Outage) |
| TroubleOrder | 0..unbounded | [TroubleOrder](#TroubleOrder) | see [Outage](#Outage) |
| TroubleTicket | 0..unbounded | [TroubleTicket](#TroubleTicket) | see [Outage](#Outage) |

**SwitchAction**

Action on switch as a switching step.

**Native Members**

|  |  |  |  |
| --- | --- | --- | --- |
| **name** | **mult** | **type** | **description** |
| executedDateTime | 1..1 | dateTime | Actual date and time of this switching step. |
| kind | 1..1 | [SwitchActionKind](#SwitchActionKind) | Switching action to perform. |
| phases | 1..1 | [PhaseCode](#PhaseCode) | Phases of the Switching Action |
| plannedDateTime | 1..1 | dateTime | Planned date and time of this switching step. |

**SwitchingPlan**

A sequence of grouped or atomic steps intended to:

- de-energise equipment or part of the network for safe work, and/or

- bring back in service previously de-energised equipment or part of the network.

**Native Members**

|  |  |  |  |
| --- | --- | --- | --- |
| **name** | **mult** | **type** | **description** |
| approvedDateTime | 1..1 | dateTime | The date and time the switching plan was approved |
| createdDateTime | 1..1 | dateTime | Date and time that this document was created. |
| lastModifiedDateTime | 1..1 | dateTime | Date and time this document was last modified. Documents may potentially be modified many times during their lifetime. |
| purpose | 1..1 | string | Purpose of this plan, such as whether it is to move the state from normal to some abnormal condition, or to restore the normal state after an abnormal condition, or to perform some kind of optimisation such as correction of overload, voltage control, etc. |
| subject | 1..1 | string | Document subject. |
| title | 1..1 | string | Document title. |

**TroubleOrder**

Trouble order sends an incident to a crew to initiate a response to an unplanned outage.

**Native Members**

|  |  |  |  |
| --- | --- | --- | --- |
| **name** | **mult** | **type** | **description** |
| mRID | 1..1 | string | 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. |
| comment | 1..1 | string | Free-form comment associated with the trouble order. |
| description | 1..1 | string | 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. |
| Approver | 1..1 | [Approver](#Approver) | Approver of this document. |
| docStatus | 1..1 | [Status](#Status) | Status of this document. For status of subject matter this document represents (e.g., Agreement, Work), use 'status' attribute.Example values for 'docStatus.status' are draft, approved, cancelled, etc. |
| plannedExecutionInterval | 1..1 | [DateTimeInterval](#DateTimeInterval) | The planned start and end time for the trouble order. |
| status | 1..1 | [Status](#Status) | Status of subject matter (e.g., Agreement, Work) this document represents. For status of the document itself, use 'docStatus' attribute. |

**TroubleTicket**

**Native Members**

|  |  |  |  |
| --- | --- | --- | --- |
| **name** | **mult** | **type** | **description** |
| mRID | 1..1 | string | 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. |
| comment | 1..1 | string | Free-form comment associated with the trouble call for example, "customer reported a large flash", etc. |
| dateTimeOfReport | 1..1 | dateTime | Date and time the trouble has been reported. |
| description | 1..1 | string | 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. |
| firstResponderStatus | 1..1 | string | Indicates whether the first responder such as police, fire department etc.has been notified and whether they are on site or en route. |
| multiplePremises | 1..1 | boolean | Set to true if the outage report indicated that other neighbors are also out of power. |
| reportingKind | 1..1 | [TroubleReportingKind](#TroubleReportingKind) | Indicates how the customer reported trouble. |
| resolvedDateTime | 1..1 | dateTime | Date and time this trouble ticket has been resolved. |
| troubleCode | 1..1 | string | Trouble code (e.g., power down, flickering lights, partial power, etc). |
| docStatus | 1..1 | [Status](#Status) | Status of this document. For status of subject matter this document represents (e.g., Agreement, Work), use 'status' attribute.Example values for 'docStatus.status' are draft, approved, cancelled, etc. |
| status | 1..1 | [Status](#Status) | Status of subject matter (e.g., Agreement, Work) this document represents. For status of the document itself, use 'docStatus' attribute. |

**Abstract Classes**

**ConductingEquipment**

The parts of the AC power system that are designed to carry current or that are conductively connected through terminals.

**Native Members**

| **name** | **mult** | **type** | **description** |
| --- | --- | --- | --- |
| mRID | 1..1 | string | 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. |
| aliasName | 1..1 | string | The aliasName is free text human readable name of the object alternative to IdentifiedObject.name. It may be non unique and may not correlate to a naming hierarchy.The attribute aliasName is retained because of backwards compatibility between CIM relases. It is however recommended to replace aliasName with the Name class as aliasName is planned for retirement at a future time. |
| description | 1..1 | string | 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. |
| name | 1..1 | string | The name is any free human readable and possibly non unique text naming the object. |
| AssetDatasheet | 1..1 | [AssetInfo](#AssetInfo) | Datasheet information for this power system resource. |
| Assets | 1..\* | [Asset](#Asset) | All assets represented by this power system resource. For example, multiple conductor assets are electrically modelled as a single AC line segment. |
| Clearances | 1..\* | [ClearanceDocument](#ClearanceDocument) | All clearances applicable to this power system resource. |
| ConfigurationEvent | 1..\* | [ConfigurationEvent](#ConfigurationEvent) | All configuration events created for this Power System resource. |
| Controls | 1..\* | [Control](#Control) | The controller outputs used to actually govern a regulating device, e.g. the magnetization of a synchronous machine or capacitor bank breaker actuator. |
| DiagramObjects | 1..\* | [DiagramObject](#DiagramObject) | The diagram objects that are associated with the domain object. |
| GenericAction | 1..\* | [GenericAction](#GenericAction) | The generic action that is performed on the power system resource |
| InstanceSet | 1..1 | [InstanceSet](#InstanceSet) | Dataset containing the data objects. |
| Location | 1..1 | [Location](#Location) | Location of this power system resource. |
| Measurements | 1..\* | [Measurement](#Measurement) | The measurements associated with this power system resource. |
| Names | 1..\* | [Name](#Name) | All names of this identified object. |
| OperatingShare | 1..\* | [OperatingShare](#OperatingShare) | The operating shares of this power system resource. |
| OperationalTags | 1..\* | [OperationalTag](#OperationalTag) | All operational tags placed on this power system resource. |
| PropertiesCIMDataObject | 1..1 | [ChangeSetMember](#ChangeSetMember) | The single CIM data object in the appropriate dataset context. |
| PSREvents | 1..\* | [PSREvent](#PSREvent) | All events associated with this power system resource. |
| PSRType | 1..1 | [PSRType](#PSRType) | Custom classification for this power system resource. |
| ReportingGroup | 1..\* | [ReportingGroup](#ReportingGroup) | Reporting groups to which this power system resource belongs. |
| TargetingCIMDataObject | 1..\* | [ChangeSetMember](#ChangeSetMember) | Data objects registered. |
| VerificationAction | 1..\* | [VerificationAction](#VerificationAction) | The verification action that is performed on the power system resource |

**Inherited Members**

|  |  |  |  |
| --- | --- | --- | --- |
| **name** | **mult** | **type** | **description** |
| mRID | 1..1 | string | see [Equipment](#Equipment) |
| inService | 1..1 | boolean | see [Equipment](#Equipment) |
| normallyInService | 1..1 | boolean | see [Equipment](#Equipment) |
| Names | 1..unbounded | [Name](#Name) | see [Equipment](#Equipment) |

**Equipment**

The parts of a power system that are physical devices, electronic or mechanical.

**Native Members**

|  |  |  |  |
| --- | --- | --- | --- |
| **name** | **mult** | **type** | **description** |
| mRID | 1..1 | string | 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. |
| inService | 1..1 | boolean | Specifies the availability of the equipment. True means the equipment is available for topology processing, which determines if the equipment is energized or not. False means that the equipment is treated by network applications as if it is not in the model. |
| normallyInService | 1..1 | boolean | Specifies the availability of the equipment under normal operating conditions. True means the equipment is available for topology processing, which determines if the equipment is energized or not. False means that the equipment is treated by network applications as if it is not in the model. |
| Names | 1..\* | [Name](#Name) | All names of this identified object. |

**FaultCauseType**

Type of cause of the fault.

**Native Members**

|  |  |  |  |
| --- | --- | --- | --- |
| **name** | **mult** | **type** | **description** |
| mRID | 1..1 | string | 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. |
| description | 1..1 | string | 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. |

**FieldDispatchHistory**

The history of field dispatch statuses for this work.

**Native Members**

|  |  |  |  |
| --- | --- | --- | --- |
| **name** | **mult** | **type** | **description** |
| Crew | 1..1 | [Crew](#Crew) | The crew that has this field dispatch history. |
| PlannedOutage | 1..1 | [PlannedOutage](#PlannedOutage) | The planned outage that has the field dispatch history. |
| UnplannedOutage | 1..1 | [UnplannedOutage](#UnplannedOutage) | The unplanned outage that has the field dispatch history. |

**Incident**

Description of a problem in the field that may be reported in a trouble ticket or come from another source. It may have to do with an outage.

**Native Members**

|  |  |  |  |
| --- | --- | --- | --- |
| **name** | **mult** | **type** | **description** |
| cause | 1..1 | string | Cause of this incident. |
| comment | 1..1 | string | Free text comment. |
| createdDateTime | 1..1 | dateTime | Date and time that this document was created. |
| subject | 1..1 | string | Document subject. |
| title | 1..1 | string | Document title. |

**Name**

The Name class provides the means to define any number of human readable names for an object. A name is b>not/b> to be used for defining inter-object relationships. For inter-object relationships instead use the object identification 'mRID'.

**Native Members**

|  |  |  |  |
| --- | --- | --- | --- |
| **name** | **mult** | **type** | **description** |
| name | 1..1 | string | Any free text that name the object. |
| IdentifiedObject | 1..1 | [IdentifiedObject](#IdentifiedObject) | Identified object that this name designates. |
| NameType | 1..1 | [NameType](#NameType) | Type of this name. |

**NameType**

Type of name. Possible values for attribute 'name' are implementation dependent but standard profiles may specify types. An enterprise may have multiple IT systems each having its own local name for the same object, e.g. a planning system may have different names from an EMS. An object may also have different names within the same IT system, e.g. localName as defined in CIM version 14. The definition from CIM14 is:

The localName is a human readable name of the object. It is a free text name local to a node in a naming hierarchy similar to a file directory structure. A power system related naming hierarchy may be: Substation, VoltageLevel, Equipment etc. Children of the same parent in such a hierarchy have names that typically are unique among them.

**UsagePoint**

Logical or physical point in the network to which readings or events may be attributed. Used at the place where a physical or virtual meter may be located; however, it is not required that a meter be present.

**Native Members**

|  |  |  |  |
| --- | --- | --- | --- |
| **name** | **mult** | **type** | **description** |
| estimatedLoad | 1..1 | [CurrentFlow](#CurrentFlow) | Estimated load. |
| phaseCode | 1..1 | [PhaseCode](#PhaseCode) | Phase code. Number of wires and specific nominal phases can be deduced from enumeration literal values. For example, ABCN is three-phase, four-wire, s12n (splitSecondary12N) is single-phase, three-wire, and s1n and s2n are single-phase, two-wire. |
| ratedCurrent | 1..1 | [CurrentFlow](#CurrentFlow) | Current flow that this usage point is configured to deliver. |
| ratedPower | 1..1 | [ActivePower](#ActivePower) | Active power that this usage point is configured to deliver. |
| EndDevices | 1..\* | [EndDevice](#EndDevice) | All end devices at this usage point. |

**VerificationAction**

Verification of a switch position or other condition as a switching step

**Native Members**

|  |  |  |  |
| --- | --- | --- | --- |
| **name** | **mult** | **type** | **description** |
| description | 1..1 | string | 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. |
| executedDateTime | 1..1 | dateTime | Actual date and time of this switching step. |
| phases | 1..1 | [PhaseCode](#PhaseCode) | Phases of the Switching Action |
| verificationCondition | 1..1 | string | freeform description of the condition to be verified |

**Enumerations**

**AreaKind**

Enumeration for the type of area defined; e.g., county, state, parish, zipcode, etc.

|  |  |
| --- | --- |
| **name** | **description** |
| borough | Enumeration for the type of area defined for the borough |
| county | Enumeration for the type of area defined for the county |
| parish | Enumeration for the type of area defined for the parish |
| serviceArea | Enumeration for the type of area defined for the service area |
| state | Enumeration for the type of area defined for the state |
| township | Enumeration for the type of area defined for the township |
| ward | Enumeration for the type of area defined for the ward |
| zipcode | Enumeration for the type of area defined for the zipcode |

**PhaseConnectedFaultKind**

The type of fault connection among phases.

|  |  |
| --- | --- |
| **name** | **description** |
| lineOpen | The fault is when the conductor path is broken between two terminals. Additional coexisting faults may be required if the broken conductor also causes connections to grounds or other lines or phases. |
| lineToGround | The fault connects the indicated phases to ground. The line to line fault impedance is not used and assumed infinite. The full ground impedance is connected between each phase specified in the fault and ground, but not between the phases. |
| lineToLine | The fault connects the specified phases together without a connection to ground. The ground impedance of this fault is ignored. The line to line impedance is connected between each of the phases specified in the fault. For example three times for a three phase fault, one time for a two phase fault. A single phase fault should not be specified. |
| lineToLineToGround | The fault connects the indicated phases to ground and to each other. The line to line impedance is connected between each of the phases specified in the fault in a full mesh. For example three times for a three phase fault, one time for a two phase fault. A single phase fault should not be specified. The full ground impedance is connected between each phase specified in the fault and ground. |

**SwitchActionKind**

Kind of action on switch.

|  |  |
| --- | --- |
| **name** | **description** |
| close | Close the switch. |
| disableReclosing | Disable (automatic) switch reclosing. |
| enableReclosing | Enable (automatic) switch reclosing. |
| open | Open the switch. |

**TroubleReportingKind**

Kind of trouble reporting.

|  |  |
| --- | --- |
| **name** | **description** |
| app |  |
| call | Trouble call received by customer service representative. |
| email | Trouble reported by email. |
| ivr | Trouble reported through interactive voice response system. |
| letter | Trouble reported by letter. |
| other | Trouble reported by other means. |
| sms |  |
| web |  |

**Compound Types**

**DateTimeInterval**

Interval between two date and time points, where the interval includes the start time but excludes end time.

**Members**

|  |  |  |  |
| --- | --- | --- | --- |
| **name** | **mult** | **type** | **description** |
| end | 1..1 | dateTime | End date and time of this interval. The end date and time where the interval is defined up to, but excluded. |
| start | 1..1 | dateTime | Start date and time of this interval. The start date and time is included in the defined interval. |

**ElectronicAddress**

Electronic address information.

**Members**

|  |  |  |  |
| --- | --- | --- | --- |
| **name** | **mult** | **type** | **description** |
| email1 | 1..1 | string | Primary email address. |

**ServicePointOutageSummary**

Summary counts of service points affected by an outage. These counts are sometimes referred to as total and critical customer count.

**Members**

|  |  |  |  |
| --- | --- | --- | --- |
| **name** | **mult** | **type** | **description** |
| criticalCount | 1..1 | integer | Number of critical service (delivery) points affected by an outage. |
| totalCount | 1..1 | integer | Number of all service (delivery) points affected by an outage. |

**Status**

Current status information relevant to an entity.

**Members**

|  |  |  |  |
| --- | --- | --- | --- |
| **name** | **mult** | **type** | **description** |
| dateTime | 1..1 | dateTime | Date and time for which status 'value' applies. |
| reason | 1..1 | string | Reason code or explanation for why an object went to the current status 'value'. |
| remark | 1..1 | string | Pertinent information regarding the current 'value', as free form text. |
| value | 1..1 | string | Status value at 'dateTime'; prior status changes may have been kept in instances of activity records associated with the object to which this status applies. |

**Datatypes**

**ActivePower**

Product of RMS value of the voltage and the RMS value of the in-phase component of the current.

XSD type: float

**CurrentFlow**

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

XSD type: float