UML model of IEC61850 and mappings to CIM
- model handover to IEC -

CIMug
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tatjana.kostic@ch.abb.com
on behalf of ABB Switzerland team:
Tanja Kostic, Christian Frei, Otto Preiss
Model background

- Developed during 2001-2004, with IEC61850 Ed.1
  - To understand IEC61850 😊
  - Showcase for use of UML in all IEC data models
  - Support identification of common aspects between CIM and IEC61850
  - Support harmonisation of data models in IEC TC57
  - Generation of IEC specifications from data model
    - Alleviate ambiguities and preserve consistency
- Several papers published
  - Many requests for UML model of IEC61850
- Since November 2008
  - Approval by ABB management to donate it to IEC
  - Models of 2004 ported from RationalRose to EnterpriseArchitect tool
  - Mappings with CIM updated to latest CIM releases
  - Somewhat improved documentation, but lot left to do
"With reference to earlier IEC TC57-WG19 Convenor's request and to our related answer, we hereby re-confirm, on behalf of the ABB's owner of patent application WO 2006/017944 titled "Bi-directional data conversion between IEC 61850 – IEC 61970", that ABB is willing to comply with the "IEC Directives Part 1 (2004) - 2.14 Reference to patented items" and particularly to the "Administrative Circular AC/10/2007 - Annex 1, Clause 2.1". Specifically, we are available "to negotiate licenses free of charge with other parties on a non-discriminatory basis on reasonable terms and conditions". The license might also include a SW package for implementation purposes, under same conditions."

Approved on Nov 24, 2008

In top packages

Disclaimer: Initial version of this model has been developed by ABB Switzerland, Corporate Research and donated to IEC TC57 for further maintenance.
Model structure

- Rationale
  - Distinguish CIM from non-CIM
  - Acknowledge WG responsibilities
  - Facilitate overall model management, parallel development and evolution (merging)
Suggested usage

- Be master for IEC61850 modelling
- Used for generation of IEC specifications
- Used for generation of schemas (non-SCL XSD, DDL, csv)
- Basis for continued CIM-61850 harmonization work
### 5.4.3 LN: Direction-comparison * Name: PDIR

For a description of this LN, see IEC 61850-5. The operate decision is based on an agreement on the fault direction signals from all directional-fault sensors (for example directional relays) surrounding the fault. The directional comparison for lines is made with PSC1.

<table>
<thead>
<tr>
<th>Attribute-Name</th>
<th>Attr.-Type</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>LNName</td>
<td>x</td>
<td>Shall be inherited from Logical-Node-Class (see IEC 61850-7-2) x</td>
</tr>
</tbody>
</table>

#### Data:

**Common Logical Node Informations**

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OpCtrlIn</td>
<td>INCa</td>
<td>Resistable operation counter</td>
</tr>
<tr>
<td>OpCtrlOut</td>
<td>OUTa</td>
<td>Start (appearance of the first related fault signal)</td>
</tr>
<tr>
<td>Optx</td>
<td>ACTx</td>
<td>Operate (decision from all sensors that the concerned object is faulted)</td>
</tr>
</tbody>
</table>

**Status Informations**

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RsDLTimms</td>
<td>INGa</td>
<td>Reset Delay Time</td>
</tr>
</tbody>
</table>

#### Table 7: Attributes of LNGroupP::PDIR

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inst</td>
<td>ACDx</td>
<td>If PDIR-Sig-general = TRU, an appearance of the actual fault has been detected.</td>
</tr>
<tr>
<td>Op</td>
<td>ACTx</td>
<td>Operate (decision from all sensors that the concerned object is faulted).</td>
</tr>
<tr>
<td>RsDLTimms</td>
<td>INGa</td>
<td>Reset Delay Time, before reset conditions have been met.</td>
</tr>
</tbody>
</table>

Table 7 shows all attributes of PDIR.
Credits (alphabetical order)

- For helping us initially understand IEC61850 and feeding some of our comments back to IEC
  - Klaus-Peter Brand
  - Christoph Brunner
  - Karlheinz Schwarz
  - Wolfgang Wimmer

- For helping us understand CIM naming hierarchies
  - Lars-Ola Osterlund