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

CIMug
November 9, 2009

- **Model background**
- **Legal**
- **Model structure**
- **Intended model usage and evolution**
- **Credits**

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

Legal

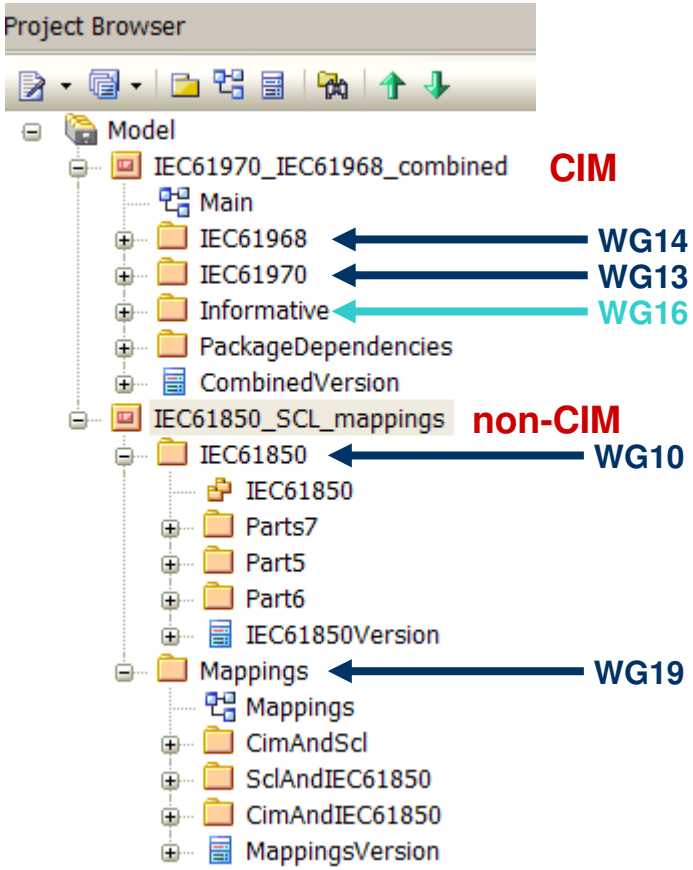
"With reference to earlier IEC TC57-WG19 Convenor's request and to our related answer, we hereby re-confirm, on behalf of the ABB's owner of patent application WO 2006/017944 titled "Bi-directional data conversion between IEC 61850 – IEC 61970", that ABB is willing to comply with the "IEC Directives 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

Suggested usage: Example LN

IEC 61850-7-4/FDIS © IEC(E) – 21 – (generated from UML with JCleanCim)

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~~ of the fault direction signals from all directional fault sensors (for example directional relays) surrounding the fault. The directional comparison for lines is made with PSCH.

PDIR class				
Attribute Name	**Attr. Type**	**Explanation**	**T**	**M/O**
LNName		Shall be inherited from Logical-Node Class (see IEC 61850-7-2)		
Data				
Common Logical Node Information				
		LN shall inherit all Mandatory Data from Common Logical Node Class		M
OpCntRs	INC	Resetable operation counter		O
Status Information				
Str	ACD	Start (appearance of the first related fault direction)		M
Op	ACT	Operate (decision from all sensors that the surrounded object is faulted)	T	M
Settings				
RsDlTmms	ING	Reset Delay Time		O

5.5.4 → Direction comparison LN: PDIR

Used for the trip decision based on an agreement on the fault direction signals from all directional fault sensors (e.g. directional relays) surrounding the fault. The directional comparision for lines is made with PSCH.

part 7-4, sec. 5.4.3

Table 7 shows all attributes of PDIR.

Table 7 – Attributes of LNGroupP::PDIR

Name	Type	Description	M/O/C
Str	ACD	If 'PDIR.Str.general=TRUE', an appearance of the first fault-related direction has been detected.	M
Op	ACT_transient	Operate (decision from all sensors that the surrounded object is faulted). If 'PDIR.Op.general=TRUE', PDIR decided to trip (decision from all sensors that the surrounded object is faulted). The trip itself is issued by PTRC.	M
RsDlTmms	ING	'PDIR.RsDlTmms.setVal' is time delay, in ms, before reset once reset conditions have been met.	O
OpCntRs	INC	inherited from:GroupP	O
Mod	INC_ModeBehaviour	inherited from:DomainLN	M
Beh	INS_ModeBehaviour	inherited from:DomainLN	M
Health	INS_HealthState	inherited from:DomainLN	M
NamPlt	LPL	inherited from:DomainLN	M

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