WG13 Issues - CIM Issues #6452

Allow multiple RatioTapChanger on one TransformerEnd

06/28/2023 10:04 AM - Yang Feng

Status:	Closed		
Priority:	Normal		
Target version:			
Author/Contact Info:	Yang Feng	**Standard(s):**	61970-301,61970-452
Base Release:	CIM18	**Version:**	
Solution to be Applied To:	CIM18v11	**Clause:**	
Solution Version:	CIM18v11	**Sub-Clause:**	
Solution Applied By:	Chavdar Ivanov	**Paragraph:**	
Completion Date:	06/04/2024	**Table:**	
CIM Keywords:	61970-Wires	**Originally Closed in Version:**	
Breaking Change:	Yes	**Origination Date:**	06/28/2023
Breaking Change Description:	May need product adjustment to handle multiple tap changers on the same winding in simulations like power flow, state estimation...	**Origination ID:**	
CIM Impacted Groups:	WG13	**Originally Assigned To:**	
Requestor:			

Description

The current cardinality only allows one RatioTapChanger to be associated to a PowerTransformerEnd. I've come across multiple scenarios where a transformer may have two RatioTapChanger on one PowerTransformerEnd, one of which is on-load tap changer and the other one is off-load tap changer. Attached I've added one example from a real customer data describing it.

Proposed Solution

Change the cardinality to 1:0..2 (if this is allowed) or to 1:0..*
Most of the cases I have seen is to have two RatioTapChanger, never encountered more than two scenario

In addition there is a need to discuss: The possibility to have both a PhaseTapChangerTable and a RatioTapChangerTable assigned to a TapChanger in EQ and an attribute in SSH to denote which is active (reported by HOPS)

In addition there is a request to have a tap changer that has both ratio and phase tap changer on same winding and the winding connection angle is changing as part of the operational processes.

Slides are attached

Decision

Call 18 Oct 2023
the group is not sure that we need to change the cardinality. We rather have this modelled in a different way. Suggested to have a wider discussion in Minneapolis meeting - 23 Oct 2023

Multiple decisions are recorded in the attached document. Final agreement is to add this to the canonical CIM and profiles

Release Notes

Applied changes in canonical CIM
- added class StepOperationalLimitTable
- added class StepLimitTablePoint with attributes step and factor
- the association end RatioTapChanger.TransformerEnd is changed from 1 to 0..1
- new association is added between RatioTapChanger and TransformerEnd
- added class ConnectionAngleTapChangerTable with attribute ConnectionAngleTapChangerTable.windingConnectionAngle
- added class ConnectionAngleTapChanger
- added ConnectionAngleTapChanger.minWindingConnectionAngle, maxWindingConnectionAngle, connectionAngleStepSize, windingConnectionAngle, normalWindingConnectionAngle

- added class ImpedanceTapChangerTabular
- added class ImpedanceTapChangerTable
- added class ImpedanceTapChangerTablePoint with the following attributes: xEnd1, xEnd2, xEnd3, rEnd1, rEnd2, rEnd3, step, ratio, angle.
- the text "Note that the upper boundary is not constrained to 100 percent." is added to TapChangerTablePoint.b, .g, .r, .x

Changes are also applied to EQ (452) and SSH profiles (456)

History

#1 - 06/28/2023 10:05 AM - Yang Feng

- Standard(s) changed from 61970-301/452 to 61970-301,61970-452

#2 - 10/18/2023 11:06 AM - Chavdar Ivanov

- Status changed from New to Open

- Decision updated

#3 - 10/18/2023 11:06 AM - Chavdar Ivanov

- Status changed from Open to In Progress

#4 - 02/07/2024 06:07 AM - Chavdar Ivanov

- Proposed Solution updated

#5 - 03/09/2024 11:16 PM - Chavdar Ivanov

- Proposed Solution updated

#6 - 03/09/2024 11:40 PM - Chavdar Ivanov

- File Tap_changer_issues.pptx added

#7 - 03/12/2024 02:26 AM - Chavdar Ivanov

- File Tap_changer_issues_v2.pptx added

Updated the presentation with additional issues

#8 - 06/04/2024 03:23 PM - Chavdar Ivanov

- Base Release set to CIM18

- Solution to be Applied To set to CIM18v11

- Solution Version set to CIM18v11

- Solution Applied By set to Chavdar Ivanov

- Completion Date set to 06/04/2024

- Decision updated

- Release Notes updated

#9 - 06/04/2024 03:25 PM - Chavdar Ivanov

- File DescriptionsTransformerClasses_v4.docx added

#10 - 06/05/2024 04:09 PM - Chavdar Ivanov

- Status changed from In Progress to Closed

#11 - 02/19/2025 10:10 AM - Domagoj Peharda

Please reopen this case, the end names of two associations from RatioTapChanger to TransformerEnd is the same: TransformerEnd.

Association end names should be unique among all specialisations of a class. For example, if IdentifiedObject associates to the Name class with an end name of "Name", no specialisation of IdentifiedObject may create another association whose end name is "Name" regardless of the class to which it associates. Note that any number of associations from other classes may use the same name (e.g. "IdentifiedObject") as the association end name on the IdentifiedObject end of the association, as long as the prior rule of uniqueness among specializations is respected.

Files

Multi_TapChanger_same_winding.png	85.4 KB	06/28/2023	Yang Feng
Tap_changer_issues.pptx	471 KB	03/10/2024	Chavdar Ivanov
Tap_changer_issues_v2.pptx	959 KB	03/12/2024	Chavdar Ivanov
DescriptionsTransformerClasses_v4.docx	315 KB	06/04/2024	Chavdar Ivanov