CIM Tutorial

CIM XML Incremental Model Files

CIM XML Model Data Exchange Format Standard (IEC 61970-552-4)

Presented By
Margaret Goodrich

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Introduction

- CIM XML Model Exchange Standards: Purpose & Scope

- CIM XML Incremental Model Files

  – Incremental File Definition/Requirements

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Purpose and Scope – IEC 61970-552-4

- Is a Component Interface Specification (CIS) that describes the CIM XML format rules and conventions at a level for implementation to support the model exchange requirements.

- Describes in narrative terms with text and examples the detailed definition of the CIM XML format.

- The CIM XML format can be used to exchange any CIM-based information but most exchange content is defined via specific profiles (or subsets) to identify particular exchange requirements.

Incremental File Definition

- The CIM XML Incremental Files are also known as Difference files

- Typically, these files are used by a regulating authority or a neighboring power utility entity that has a copy of the source model and wishes to keep it equivalent to the original source model.

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Incremental File Definition

- CIM XML files for Incremental changes (Difference Models) only need contain the model changes.

- A CIM XML Incremental file contains a set of changes between two full power system models.

- The two full power system models must be the same base model but one is the model before the change is made and one is the model after the change is made.

Incremental File Requirements

- Represents the differences between two base models.

- Represents a small difference between 2 large models.

- Delete statements do not contain the statements to accommodate a cascading deletion. This is the responsibility of the receiving entity.

Incremental File Requirements

- Remove operations are not reversible.

- May contain information about itself (authorship, purpose, date, etc.)

- May contain information to protect against conflicts when 2 difference models are created concurrently from the same model (Precondition Statements).

Incremental File Structure

- The Incremental File may contain 4 types or groups of statements:
  - Header Statements (statements about the incremental file itself)
  - Forward Difference Statements (statements found in the new base model but not in the old base model)
  - Reverse Difference Statements (statements found in the old base model but not in the new base model)
  - Precondition Statements (statements found in both the old and new models and considered to be dependencies)
- Any or all of the 4 groups can be empty.

Precondition Statements

- Statements that are a subset of both the old and new model and carry no difference information.

- If difference files are applied sequentially, these statements can be omitted.

- The statements are the equivalent of a database locking mechanism to prevent any changes from occurring to those elements.

- Software that processes a difference file should verify that no changes are made to the elements contained in the Precondition statements – or it should warn about incompatible model revisions.

- The Precondition Statements contain data that is in the current model. If the contents of the Precondition Statements are not in the current model, the changes contained in the remainder of the file should be rejected and not put into the model.

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Incremental File Usage

- To add a resource to a model, use a *Forward Difference* statement.

- To delete a resource from a model, use a *Reverse Difference* statement.

- To update or change a resource in a model, use both a *Forward Difference* and a *Reverse Difference* statement.

Incremental File Example

```
rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:cim="http://iec.ch/TC57/2003/CIM-schema-cim10#"
  xmlns:dm="http://iec.ch/2002/schema/CIM_difference_model <?xml version="1.0"
  encoding="UTF-8"?>
< #">
  <dm:DifferenceModel about="">
        <dm:reverseDifferences rdf:parseType="Statements">
                <rdf:Description rdf:about="#_C5A3369878B749F7A21C3F9C6FF29867">
                        <cim:Conductor.r>1.94408</cim:Conductor.r>
                         <cim:Conductor.x>11.90251</cim:Conductor.x>
                </rdf:Description>
        </dm:reverseDifferences>
        <dm:forwardDifferences rdf:parseType="Statements">
                <rdf:Description rdf:about="#_C5A3369878B749F7A21C3F9C6FF29867">
                        <cim:Conductor.r>2.578875</cim:Conductor.r>
                        <cim:Conductor.x>9.2575</cim:Conductor.x>
                </rdf:Description>
        </dm:forwardDifferences>
  </dm:DifferenceModel>
</rdf:RDF>
```

Contact for Additional Information

- For copies of the following documents, send an email to mgoodrich@ercot.com:
    - CIM XML Model Data Exchange Format Standard - IEC 61970-552-4 – PDF Format
    - Example Incremental Model Files