ALSTOM Grid’s worldwide transmission Network Management Solution: The CIM power system modeler for EMS

**e-terra source provides:**
- A single, enterprise view of the power system, appropriate for transmission, distribution, generation and market systems, in past, present and future time contexts.
- A modeling tool designed with participation by real users, reflecting the best modeling practices and productivity features.
- A new and innovative RDBMS approach based on CIM standards from TC57.
- An integration-ready design compatible with CIGRE D2.24 information architecture concepts.

**Business challenges**

*e-terra source* is a new tool for power system modeling, where utilities are facing increasingly complex data management issues:
- System models are very large and complex power systems that are difficult and expensive to produce, debug and keep up to date.
- Accurate analysis demands accurate models. Appropriate situational awareness cannot be achieved without quality models.
- Evolving system models are needed to support real-time, forward planning and post mortem time contexts, at both the transmission and distribution levels.
- System models should be shared between different applications to save labor and minimize discrepancies in the models.

**Customer Profiles**
- Transmission and Distribution System Operations and Planning
- Regional Transmission Organizations
- Market and Generation Operations
- Utility IT Integration & Architecture Departments
Use cases for Alstom Grid’s new e-terra source modeler:

Traditional modeling for EMS takes a big step forward
If you are a utility considering buying an Alstom Grid EMS or upgrading to a new version of an Alstom Grid EMS, you may only be looking at modeling in its traditional support role.

e-terra source is the modeling application that will be supplied with all new Alstom Grid systems. It provides state of the art modeling features that will improve your ability to develop and maintain the complex power system models that are required for operational success. Some of the particularly useful new features include:

- the ability to edit the model schematically
- the multi-user work environment
- the ability to manage the evolution of the model over time

Coordinated transmission models for an interconnection
If you are part of an interconnection populated by many transmission owners, as is the case with most major utilities and regional security organizations, then you share the problem that your analytical models must cover not only your territory, but also the territory of other entities in the interconnection. Model data exchange becomes a key requirement of your operation process.

The IEC CIM standards organizations have developed a solution to this problem that can be implemented in any interconnection for either operations or planning or both, consolidated. Thanks to the Model Authority Set concepts originating from its CIM design, e-terra source supports natively CIM based model exchanges and model merges with any kind of CIM compliant systems.

Figure 1 | In the graphical modeling environment of e-terra source, new structures of the model are added and connected via convenient visual editing facilities.

Figure 2 | Past, present and future views of the power system can be managed concurrently thanks to the advanced temporal modeling in e-terra source.
Modeling as a focal point of IT integration

If you are a utility embarking on Smart Grid enterprise architecture, there are a few concepts that you may be thinking about:

- Enterprise message bus
- Webservices
- Canonical data models for semantic consistency
- The IEC TC57 CIM standards
- The CIGRE D2.24 reference architecture
- Data mastership and enterprise information flow

As a long-time player in the power system space, Alstom Grid has been at the center of efforts like CIM and CIGRE D2.24. We understand these efforts and we have designed the e-terra source product for these standards. In particular, e-terra source is designed to serve as a central enterprise component for collecting and distributing a common view of the power system (past, present or future) in standard CIM form. This enables applications to exchange business information about the power system using a common reference point.

Extending models via e-terra source meta-data driven schema

In almost any situation where you use a modeler, you may have the need to extend the kinds of data being managed beyond what is required by the Alstom Grid EMS, or beyond what is defined in the current CIM standard. If so, you will need to be able to extend the schema of the data that e-terra source is managing. We have designed e-terra source to make this a straightforward non-programming operation, thanks to its meta-data driven schema.
**e-terra source product summary**

**Key Concepts:**
- A model is a representation of some real world system, such as a power system, maintained over time – i.e. past, present and future views are available.
- A project is an annotated, dated collection of changes to a model. Projects create easy to use audit trails of activity and, when specified in the future, provide documentation of plans.
- Multiple workspaces support concurrent independent work by multiple users.
- A full model may be divided into non-overlapping model authority sets maintained by different parties.

**The model repository**
- **e-terra source** is a database application supported in Oracle and SQLServer.
- Supports a versioned storage of multiple models obeying multiple schemas.
- Schemas for models are configurable via metadata.
- Property sheets show individual objects in full detail.
- Templates allow convenient insertion of common patterns of objects.
- Project views show the operations encapsulated by a project.

**Viewing and editing**
- Graphic edit provides a schematic representation of power system objects and supports graphical insert, delete and connection operations.
- Trees provide configurable navigation through hierarchies of model objects.
- Grids provide tabular views with configurable filtering and sorting on columns.
- Templates allow convenient insertion of common patterns of objects.
- Project views show the operations encapsulated by a project.

**Import and export / Integration**
- **e-terra source** cooperates with other modeling sources via CIM standard import / export.
- **e-terra source** supplies extended CIM models for deployment to target systems.

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**Figure 4** A variety of navigational facilities simplify model building and browsing activities in e-terra source.