



Lessons Learned in Centralizing Transmission Network Model Maintenance at Oncor

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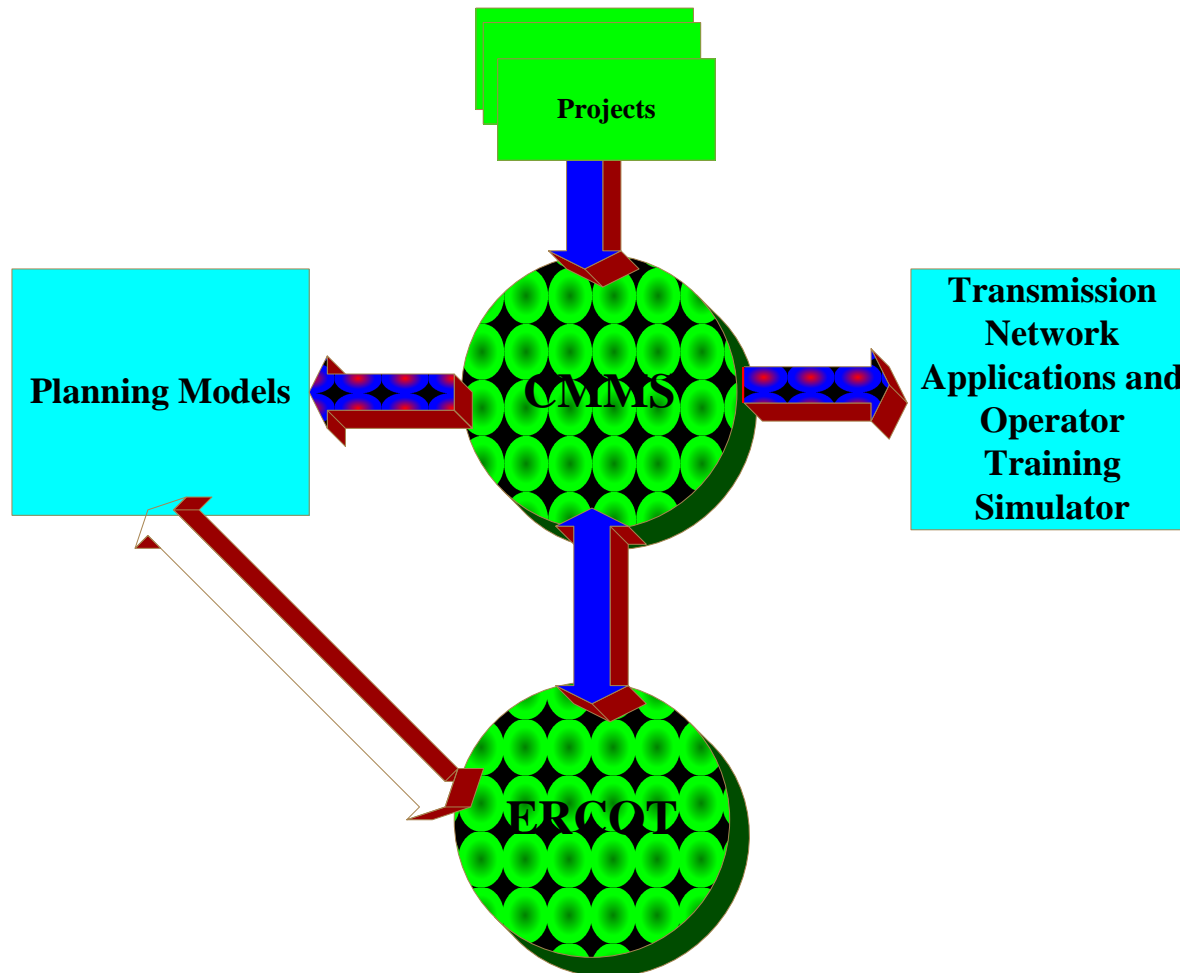
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Why Centralize Model Maintenance?

- Historically a network model was maintained for each application
- Different organizations need to be staffed to develop these model.
- Each network model was different
- Difficult to enforce consistency between the different network model.

What is Centralize Model Management at Oncor?



Making two worlds of data one



- Would like to have one organization that supports all the network modeling requirements.
- One network model that supports multiple applications.
- All model are consistent.

Merging of the Network Models

- Took approximately 4 months with 5 people working to complete initial merge of the model



Planning the merge process

- You cannot spend too much time on this activity.
- Analyze the data structure in both models. Both visually and using scripts.
- Determine what is required for the resulting network model. The core structure of one of the two models will need to be adopted and augmented for the final network model structure.
- Pick small sampling of objects that need to be merged and do the merge manually.
- There is more data in the model than what can be processed manually. Oncor worked with our vendor and developed an application that was used in the merge process.

Example of a planning stage decision

- Network model data hierarchy.
 - During the planning stage the differences between the containment hierarchy used by ERCOT and Oncor became painfully obvious.
- The hierarchy of the Oncor data was:
 - Network/Net Companies/TXUED/Dallas/ANASW
 - Orphan/Orphan/Geographical Region/Sub Geographical Region/Substation
- The Hierarchy of the ERCOT data is:
 - Network/ERCOT-Texas_Network/ERCOT Substations/WZ_North_Central/ANASW
 - Orphan/Orphan/Geographical Region/Sub Geographical Region/Substation

- So the stations was in the same relative location in the hierarchy but the path name was different.
- Further examination of the data showed that the grouping of station were not consistent at the Sub Geographical Region level.
- One of the primary goals of the merge process was to be able to exchange CIM/XML difference files with ERCOT.
- Oncor made the decision to migrate to the hierarchy as used by ERCOT and to use the ERCOT RDFIDs for each common object.
- Two new attributes where added to the CIM in the Oncor Name Space, Ercot Relevant and Data Sync.

- Another major differences was that Oncor's Network Applications required switching device names that matched the SCADA model. Also switching devices needed to be internal to a Bay. ERCOT's system does not require the usage of a Bay but does allowed it.
- To help facilitate the merge process Oncor added bays to the ERCOT model for required locations.
- The network model that ERCOT and Oncor supports above 69 kV is electrical and device equivalent. This means when the one-line for the two different network models are compared they look the same.
- How Oncor's vendor and ERCOT model consumer loads is different. A method to allow for this difference needed to be implemented.

- If you plan an using and application to assist in the merge process, proto-type each planned action.



The Merge Process

- Don't attempt to perform the merge by hand. Automate as much as you can.
- The “system level” data was missed during the planning stage.
- In the planning stage it was planned to manually merge the autotransformer. During the merge it was determined that the merge application could be used.
- Be flexible.
- Because of the vast number of ways that data can be modeled some manual merging of the data is required.
- Validate the merged model as you go. Would have been beneficial to have tested the model all the ways to the end applications

- Merging generation facilities was a problem. The merge applications had to be modified several times. There was still some items that had to be merged by hand.
- Validation rules had to be modified several times.
- The network model merge process took 5 people, 4 months to complete the initial effort. The clean-up and validation in the resultant model is on going. Expect to resolve many data issues as the model is placed into service.
- ERCOT receives an average of 1000 change requests a month to the network model. Implementing these changes to keep the models synchronized is an ongoing process.

Validating the new model with Oncor's Transmission Applications

- Implementing the usage of the new merged CIM network model was coordinate with the upgrade of the Oncor Transmission Network Applications and Operator Training Simulator.
- Vendor needed to create a new interface to directly populate these applications. This was a first time implementation.
- The Operator Training Simulator used a separate population process. Many of the same issues that where resolved for the SE and RTCA population had to be addressed again for the OTS.

- Data issues were discovered during the validation process. This was primarily in two areas. Data required to support the Operator Training Simulator and associations such as regulates or monitors an object or terminal.
- Some of the data issues were able to be scripted to correct. Others had to be done manually.

Conclusions

- The merge and validation process took longer than expected.
- Don't take shortcuts.
- Must have a working understanding of the data models that are to be merged.
- Should have done a complete profile of each data model and merged the data models. This would be identified many of the data issues that were discovered during the merge and validation process.

Based on the knowledge of the process you know have would you still merge the to model?

Definitely YES

Questions?