

Abstract:

ERCOT's Network Model Management System was designed and implemented to solve a fundamental challenge that the electrical power industry had been slow to recognize: that being, as technology moves forward, vast amounts of data must be integrated into the operational decisions of those who manage the grid, and made available to those serviced by the grid. As these technologies evolve into commercial viability, new challenges emerge: data aggregation of phase-angle measurements, use of market products like distributed resources, analysis methodologies such as solar generation forecasting, and management techniques like those required for operating energy storage devices will need to be merged into the already complicated process of energy management. In addition, pressures from enhanced regulatory oversight, the unwinding of the vertically integrated power industry model, and market pressures are pushing for transmission and generation systems to be operated closer and closer to their physical limitations. These issues may all be mitigated by using a robust integration approach heavily leveraging CIM and constructing a unified modeling system capable of acting as a single source of data for supporting all facets of electrical power transmission system modeling. The NMMS addresses all aspects of the model life-cycle: including the data entry, validation, creation of power system models, testing and finalization, and archiving of model data changes. Additionally, the system has a flexible design that supports easy integration of new items. Using CIM for data support allows for state of the art devices to be readily integrated into existing process data flows, reduces organizational adoption time, and produces a level of modeling consistency and accuracy that existing industry practices have up till now, been incapable of. The NMMS utilization of CIM allows for rapid operational integration of energy storage devices, the utilization of phase-angle measurements, the aggregation of smart-metering devices, all leading to greater operational awareness of grid conditions and the greater reliability of the system.