



PSS[®] CAPE Protection Simulation Software

Highly detailed protection simulation
for transmission and distribution networks

SIEMENS

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Siemens PSS[®]CAPE software supports the system protection function within electric power utilities. PSS[®]CAPE is used by major utilities in more than 50 countries on six continents worldwide due to its extensive library of more than 7,000 highly detailed relay models and extensive selection of modular protection tools that help engineers manage voluminous and complex network data, uncover potential problems, and examine alternative solutions.

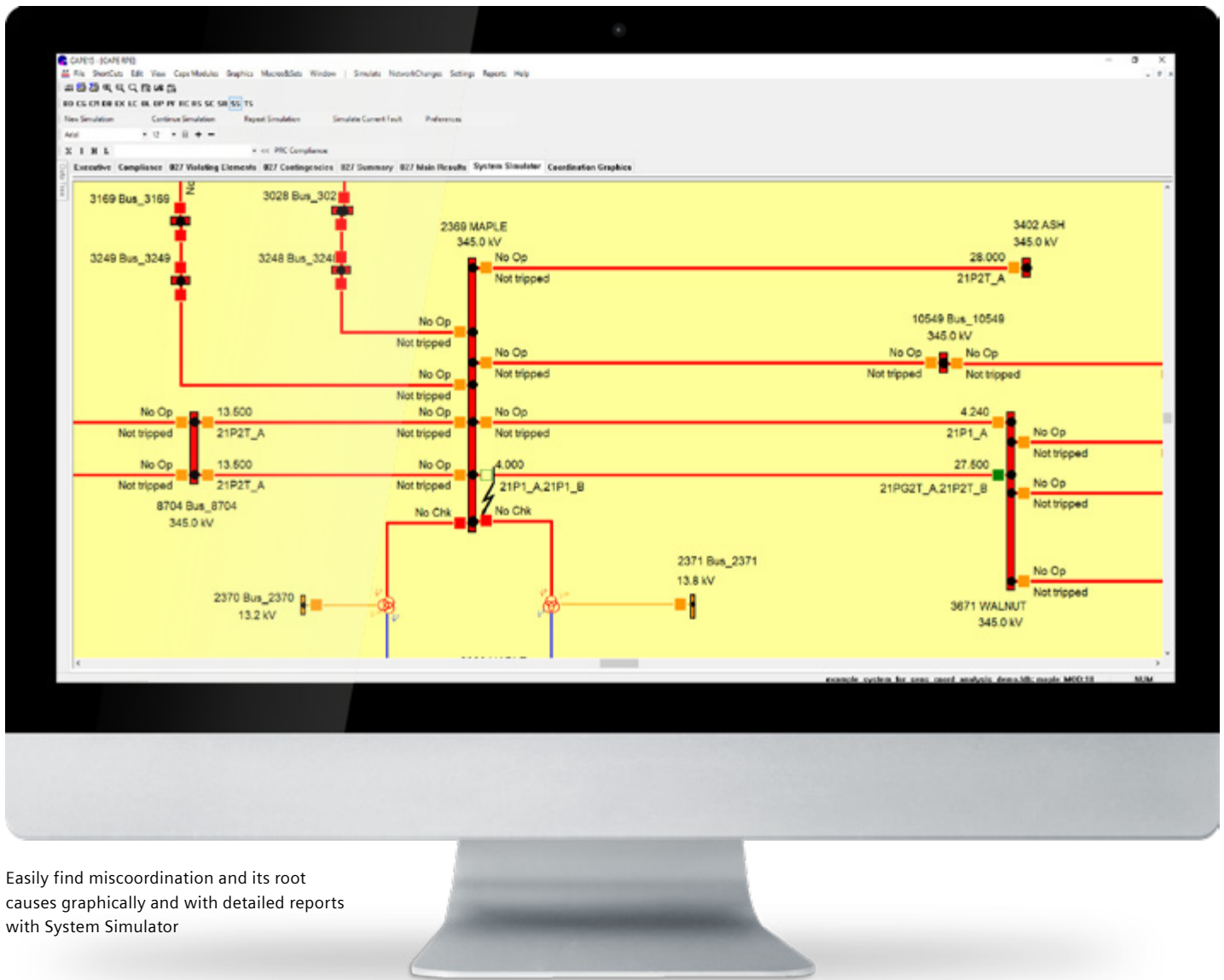
Simulating short circuits and showing the responses of protective devices is the heart of PSS[®]CAPE. It is as simple as using a mouse to click and drag elements on a one-line diagram, and to open breakers, apply faults, and simulate protective system responses. Conducting automated fault studies and wide area coordination reviews, developing incisive custom reports, performing automated protection system reliability studies and identifying fault locations, all become practical, efficient activities that add value to your organization.

Highly detailed for accurate results

PSS[®]CAPE handles networks of any size, large or small. PSS[®]CAPE users have systems ranging from under 100 buses to 10,000 buses – including protection systems with 20,000 to 50,000 relays. PSS[®]CAPE's ability to handle rich detail enables customers to create accurate protection models to realistically predict likely misoperations. PSS[®]CAPE comes with a library of relays, distribution reclosers, and fuses, all ready to use out of the box. PSS[®]CAPE facilitates automatic importing of relay settings from native relay manufacturer files, eliminating the need for manual entries which could result in errors.

Get the most from your data

PSS[®]CAPE is built upon a true relational database, which is included with the software. The underlying DBMS is fully ODBC- and SQL-compliant; therefore, the PSS[®]CAPE database may be accessed with programs like Oracle and Microsoft Access. All of the modules use the same PSS[®]CAPE database data, so any data item is entered once and may be used many times.



Easily find miscoordination and its root causes graphically and with detailed reports with System Simulator

PSS®CAPE Pro-Standard package features:

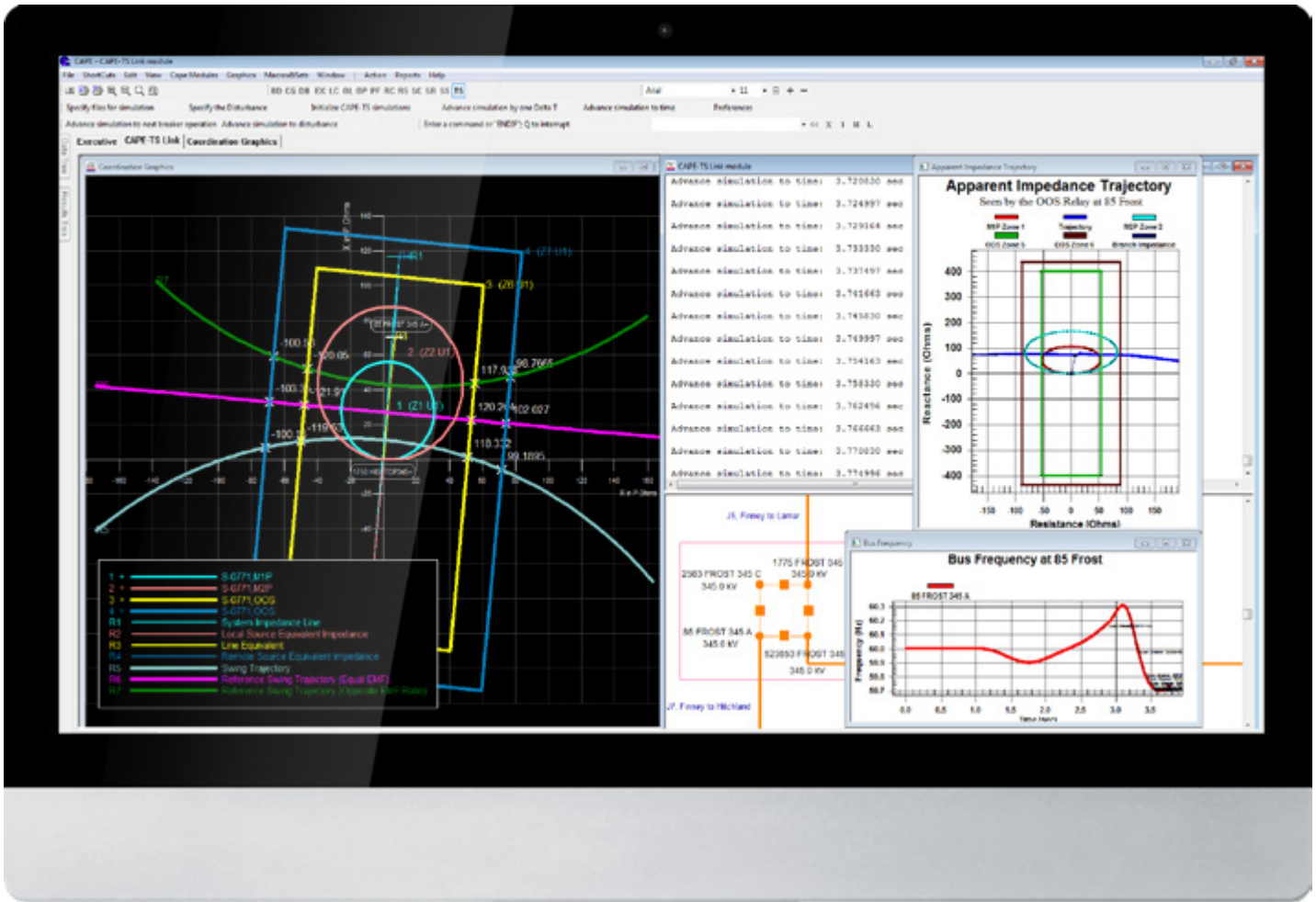
PSS®CAPE Database Editor is used to build and maintain the database of integrated network and system protection models. Special features for easy transformer model building; relay, recloser, and fuse model import; data merging, and quick entry of protection data.

Short Circuit calculates any type of fault on any size system. Supports standard and customized reporting, automated fault studies, fault location analysis, and user-defined fault conditions.

One-Line Diagram is used for building and maintaining a system one-line diagram and display of data, short circuit, and protection simulation results. Direct access for opening breakers and applying faults.

Coordination Graphics displays overcurrent and distance protective device characteristics. Supports interactive contingency and fault application, graphical relay resetting, and resetting of relay and distribution recloser taps and test points.

Relay Setting represents a company's relay setting procedures as user-written macros that perform fault studies, compute raw relay settings, and select actual taps. A library of "starter macros" is included. Relay Checking provides automated stepped-event simulation of the protection system in response to a variety of fault scenarios. This unique capability allows users to perform wide area evaluations of protection to uncover miscoordinations.



Evaluate the interdependency between protection action and system dynamic with PSS@CAPE-TS Link simulations.

System Simulator performs stepped-event event simulations of single-scenario studies interactively with the one-line diagram, with enhanced and detailed reporting at each breaker operation.

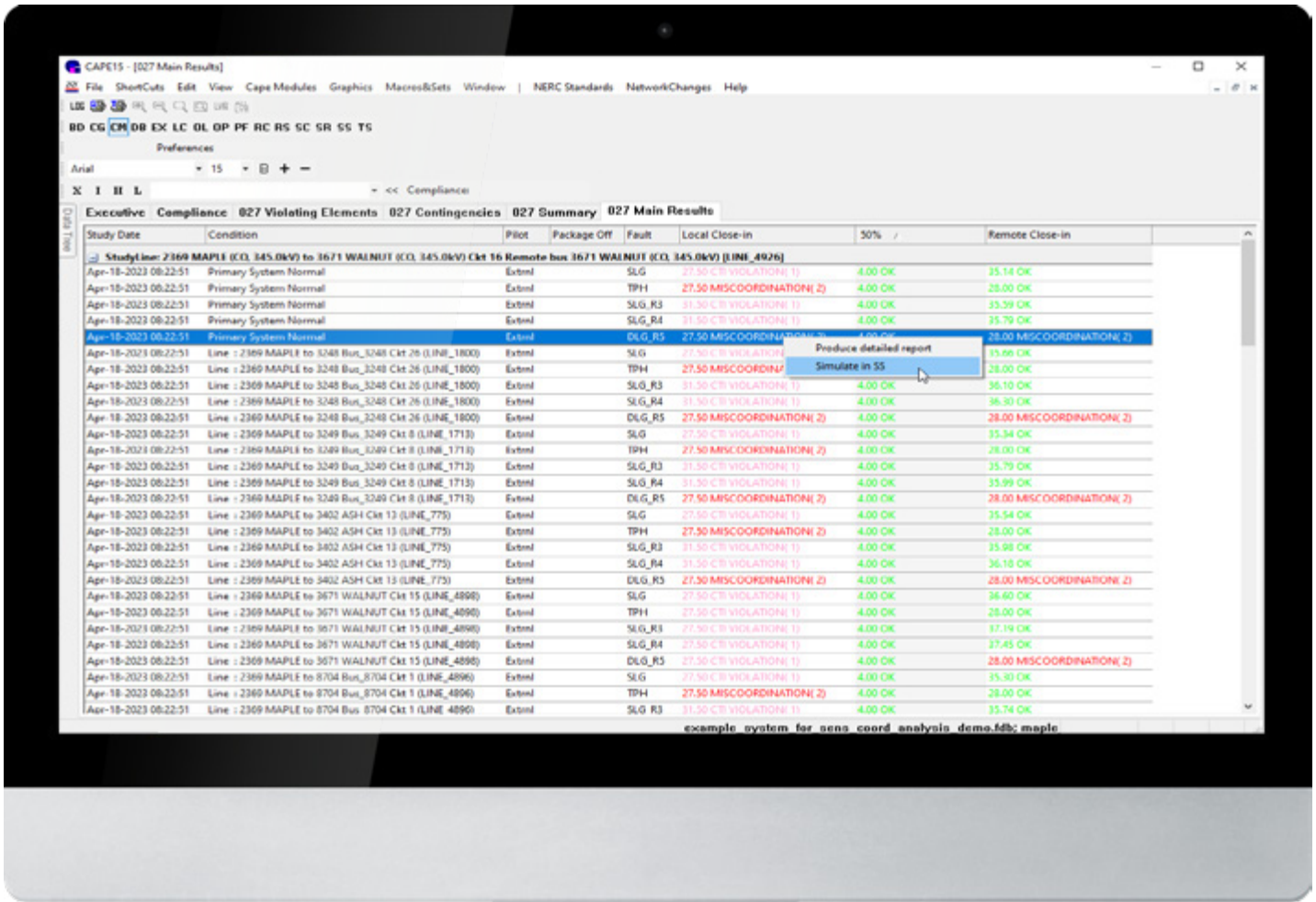
Line Constants computes the self-positive sequence impedance and the self and mutual zero sequence impedances of overhead transmission lines based on conductor and tower data.

Order Production generates data-driven reports on paper of relay settings based on taps and test points for specific locations.

Optional PSS@CAPE functions

Power Flow offers both Newton and Fast Decoupled solution methods. Control algorithms support tap and phase-shifting transformers, voltage control by reactive generation, switched capacitor bank operation, and area interchange control.

Short Circuit Reduction offers two types of network reduction; useful for providing reduced models for EMTF calculations, for other “non-PSS@-CAPE” programs, and for sharing data with a utility’s neighbors.



Wide-area coordination reviews results are easily identified using traffic light-colors in the automated Compliance Module.

Breaker Duty automates the evaluation of breaker interrupting duty following approved procedures of either the IEC or ANSI standards. Streamlines the evaluation of new and existing breakers.

PSS@CAPE Bridge Module provides two-way data exchange of network and protection data with asset management systems.

PSS@CAPE-TS Link integrates the highly detailed protection models and data from PSS@CAPE with the PSS@E time-domain transient stability program to evaluate the interdependency of system dynamic and protection action. Protection directly affected by power swings, such as Out-of-Step, Power Swing Blocking, Underfrequency Load

Shedding Schemes, ROCOF, Remedial Action Schemes, for example, are easily analyzed using this module.

Compliance Module comprises automatic protection system reliability studies, including revision of protection coordination in wide network areas, evaluation of the behavior of transmission and generation protection upon overload conditions, the coordination of generator controls and its protection, as well as other protection reliability checks. For North American users, these reliability studies support compliance with NERC PRC standards PRC-027, PRC-023, PRC-026, PRC-019, PRC-024, and PRC-025 standards.



Generator protection coordination with generator controls is automatically evaluated with the Compliance Module.

Flexible Licensing Options

Licensing of the PSS®CAPE software is very flexible as it offers three methods for licensing, including individual user licenses, network licenses for a server and network licenses for a virtual server. In addition, a "borrowable" option allows an engineer to "check out" or borrow a license from a network license to use the PSS®CAPE license when not connected to the office network.

PSS®CAPE community PSS®CAPE users are part of an active network of protection engineering expertise, worldwide. An annual User Group Meeting & Conference in North America and User Group Meetings and Summits in other regions provide content-rich opportunities to make connections in person.

Ready to get started?

Siemens makes the transition easy for you including the license acquisition, training, implementation, consulting and ongoing software updates and support. Siemens is uniquely qualified to provide a complete and comprehensive offering to our customers.

Find out more at
www.siemens.com



Accelerating Digital Transformation at American Electric Power

American Electric Power (AEP), the largest transmission grid operator in the U.S, is tackling the energy transition head-on by implementing a digital twin of its entire transmission network. By breaking down data silos, the utility will have one common network model that all departments work from to ensure reliable planning, operation, and protection of the power grid.

Data is at the center of the power grid. It is exchanged between many different departments, stakeholders, and systems, enabling utilities to properly plan, operate, and maintain their grid. With trends like decentralization, digitalization, and renewables, this data has become increasingly complex to manage and exchange.

As grid planning and operations becomes more complex, traditional, siloed, manual practices for sharing model data across departments are no longer optimal. The Siemens Network Model Management solution provides a single source

of truth for model data across planning, protection, and operations departments. By leveraging a complete digital model of the physical grid, AEP can quickly adapt to grid changes while increasing renewable capacity efficiently, safely, and reliably.

Breaking down silos with a unified network model

The Network Model Management system at AEP leverages Siemens consulting expertise and our interoperable, open, and scalable software to break down the data silos between traditionally separate departments.

Powered by the CIM-based network model management software, PSS®ODMS, the system enables seamless data exchange between various software tools, including PSS®CAPE – highly-detailed protection simulation software, PSS®E – high-performance transmission planning and analysis software, and additional 3rd party tools.



More AEP network facts at www.siemens.com



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