

CAPE User Group Meeting Update

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CAPE User Group Meeting Highlights

- Inverter Based Resources Modeling Presentation by EPRI
 - Separate slides
- Updates to Compliance Modules
 - PRC-019, PRC-023, PRC-024, PRC-025, PRC-026, PRC-027
- CAPE will move from Firebird Database to MS SQL Server Database
 - More utilities uses MS SQL Server Databases and have expertise in them
 - Better integration of databases with corporate database structure
 - Dates to keep in mind
 - Spring 2022 – beta
 - End of 2022 – installed in production version
 - End of 2023 – full transition to MS SQL Server
- Changes to CAPE
 - Added more fields to improve round trip with PSS®E and Aspen
 - Added new fields for Powerbase mapping

CAPE User Group Meeting Highlights (cont.)

- Changes to CAPE (cont.)
 - Added new / improve relay models
 - Improve solution engine for wide area coordination studies
 - 3 – 7 times faster
 - Included in CAPE 15
- Aspen Import / Export Change file
 - CAPE has support for Aspen version 14 Change file
 - Capable of Add / Modify / Delete data
 - Version 15 format has just been sent to Electrocon
- Studies performed with CAPE & other tools
 - Large power plant out of step protection settings considering dynamic simulations
 - Underfrequency load shedding studies done by Xcel Energy
 - Line modeling in CAPE using GIS

CAPE's IBR Issues and Possible Solutions

- Convergence Issues
 - Convergence problems with weak sources.
 - Type IV generator isolated by open breakers.
 - Three-phase fault at generator terminals.
 - Generator islanded by fault.
- Possible Solutions
 - Apply close-in fault.
 - Insert small resistance in fault.
 - CAPE uses an iterative solution with limited current.
 - After 30 iterations, set $I_d=0$ and $I_q=\text{limit}$.
 - Then I_p lags +seq network voltage by 90 degrees.
 - If still no convergence, remove the generator.

CAPE's IBR Roadmap

- Negative-sequence current for Type IV.
 - EPRI has provided the updated manual for the German Grid Code.
- Type III updates.
 - EPRI has provided the manual for Type III.
- Tentatively implemented by the end of the year