

User Defined Models



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Kate Davis, Ph.D.



PowerWorld
Corporation

Model Interoperability



- Modeling and validation is challenging enough without the added difficulty of how to share models between users and programs
- There is a need for interoperable transient stability models (modular)
- Users should be able to easily create and simulate their own models and share them with others

PowerWorld Solution



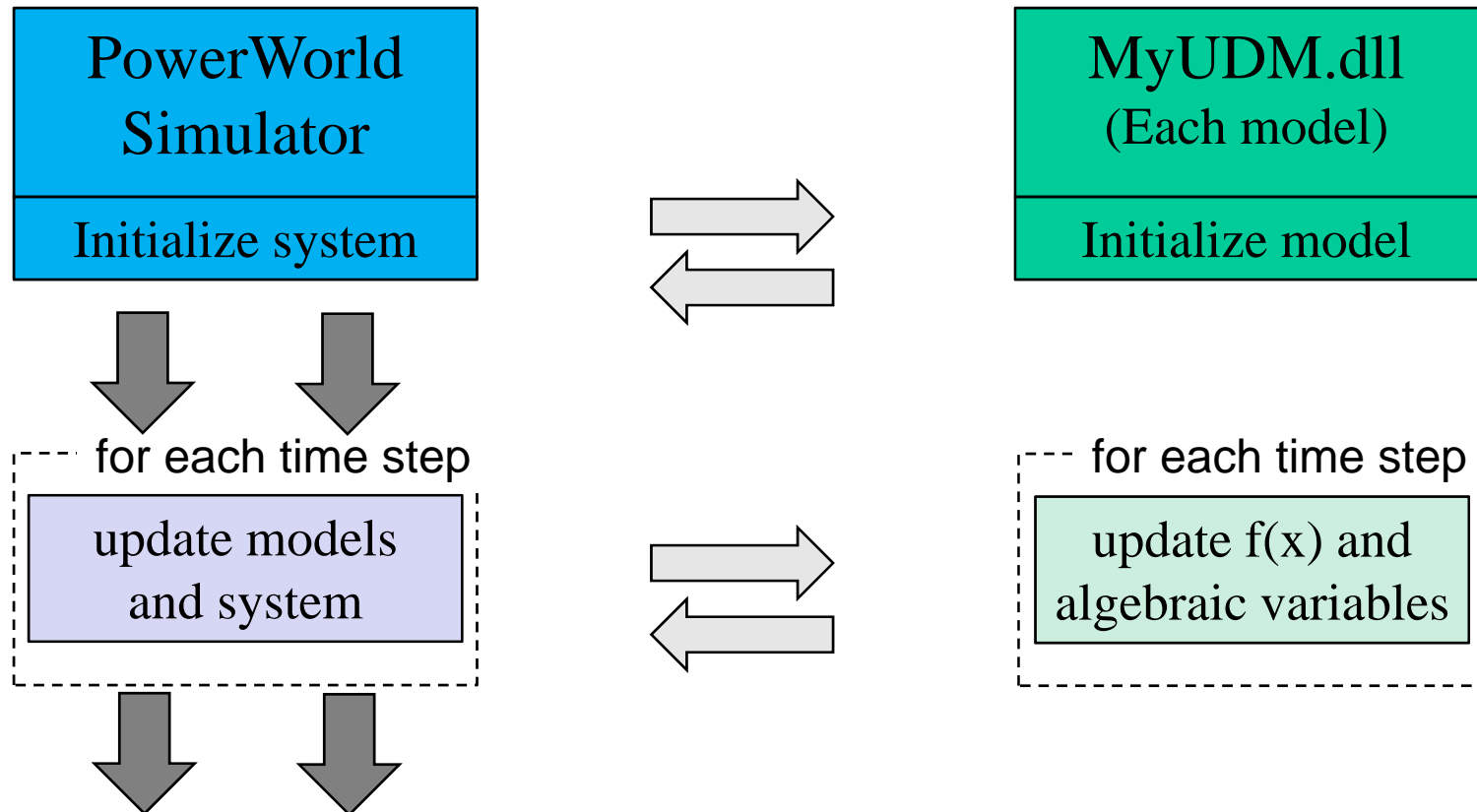
- Each user defined model (UDM) is created as a dynamic link library (DLL), which contains code for implementing the model
- Applications can call DLLs developed in other languages (Visual Basic, C, C++) using standard calling conventions
- By design, the UDM DLLs have a well-defined interface with the transient stability software program

Details - How it Works



- A user designs a model
- The user writes a DLL for the model, creating functions needed by the calling application (a black box)
- Inner details of the DLL are not known by the calling application, so they could be kept confidential
 - A manufacturer can design a single model for many people to use

Conceptual Design



**Transient Stability Simulation
With User Defined Models**

PowerWorld Implementation



Supported Model Types

- ✓ Machine
- ✓ Exciter
- ✓ Governor
- ✓ Stabilizer
- Load

Initial work has focused on adding support of user defined transient stability models of these types

PowerWorld Implementation



- Inserting the model
 - ✓ – Tell Simulator the model type (machine, exciter, governor, etc.), the model name, and the DLL location
 - ✓ – Add instances of the model to particular generators/loads in the case and set their parameters
 - Select the Simulator signals to serve as DLL input/output, if applicable, or use defaults

DEMO



Summary



- The design of user defined model DLLs promotes flexibility
 - DLLs may be written in other programming languages
 - DLLs are easily shared by different users and even software applications
- Feedback/Comments?
- Suggestions?

Kate Davis
kate@powerworld.com