



CIM User Group Meeting, Genval, May 12-15, 2009



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DlgSILENT Activities



Consulting & Research

- System Studies
- System Tests
- Training / Seminars

Software

PowerFactory
StationWare

Hardware

PowerFactoryMonitor



DlgSILENT Home Office



DlgSILENT Home Office

The DlgSILENT Group
>50 experts in 5 countries

DlgSILENT Partners

Vector PS, United Kingdom
IE-SRL, Argentina
IEB, Colombia
PTI South Asia, Malaysia
NSE, Switzerland
Megawatt, Peru
E2Q, Spain

DlgSILENT Group

DlgSILENT GmbH, Germany
DlgSILENT STREL SRL, Italy
DlgSILENT Buyisa (Pty) Ltd., South Africa
DlgSILENT Pacific Ltd., Australia
DlgSILENT (Chile) Ltda.



PowerFactory Functional Overview

Integrated PowerFactory Functions

Load Flow: balanced / unbalanced (1-,2-,3-phase AC / DC)

Contingency Analysis

Fault Analysis: IEC 60909 / ANSI, complete method, multiple faults

Harmonics Analysis: characteristic and non-characteristic harmonics

Stability: balanced / unbalanced AC/DC systems, Eigenvalue analysis

Electromagnetic Transients (EMT)

Reliability Analysis

Protection Simulation and Coordination

Optimal Power Flow

State Estimation

Parameter Identification

Overhead Lines / Cable Layout

Script Language



PowerFactory References (>110 countries; > 5000 licenses)

Transmission & Distribution Companies

National Grid (UK), Terna (Italy), Western Power (Australia), EnergiNet (Denmark), Swissgrid (Switzerland, UCTE), ESKOM (SA), EnBW (GER), Scottish Power (UK), Eirgrid (IL), ISA (Colombia), PLN (Indonesia), EGAT (Thailand),...

Industrial Customers

Petronas (Malaysia), Shell (NL), Pemex (Mexico), Petrobras (Brazil), Vattenfall-Mining, VW, Ford, ABB Industries (Switzerland), BMW (Germany),...

Universities and Research Institutes

Risø (Denmark), ISET, DEWI (GER), IEN (PL), Universities (Madrid, Glasgow, Belfast,...)

Engineering Companies

KEMA (NL), CESI (Italy), Fichtner (GER), TCS (India), Garrard Hassan (UK), PB-Power (UK/SA/AU), SKM (UK/AU/NZ), RES (UK/US),...

Manufacturers

Siemens (Germany), Vestas (Denmark), REpower (Germany), ENERCON (Germany), Nokian Capacitors (Finland), ABB (Sweden, Spain, Switzerland), VATECH (Austria), MAN (Germany),...



Data Management using CIM



Topics

Data Exchange – Proprietary Formats vs. CIM

CIM UCTE IOP Paris

CIM Roadmap and Expectations

Data Management in PowerFactory

Data Management related to UCTE DACF Process

Conclusion



Data Exchange without CIM

PowerFactory import filters for proprietary formats

- PSS/E, PSS/U, Integral/DVG, Neplan, ...

Drawback

Version dependent, formats and data model not well specified, official test cases not available, no IOP tests

PowerFactory import/export filter for UCTE standard

- UCTE-DEF

Limitations

Supports basic load flow and short-circuit data exchange only

Important network elements missing, e.g. Shunts, 3W-Transformers

Unique identifier for network elements not supported



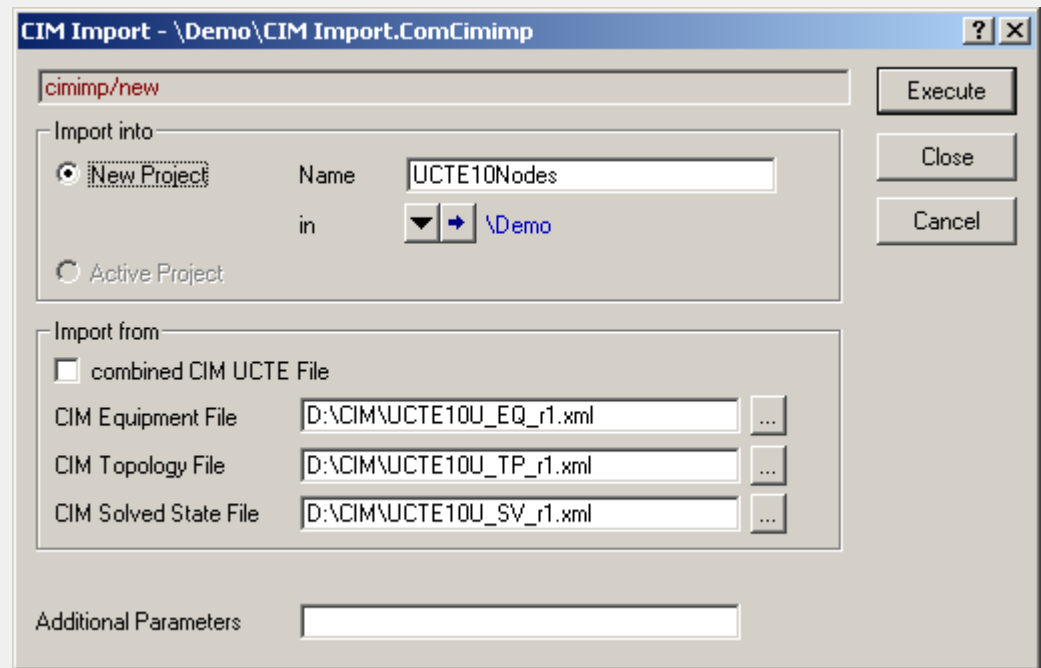
CIM UCTE – IOP Paris 2009

PowerFactory test results

- All tests passed
- Import/Export of full network models
- Import/Export of solved cases
- Load flow results matching

CIM support in PowerFactory

- Import/Export via PowerFactory user interface (File\Import\CIM...)
- Import of solved case into Operational Scenario possible





Data Exchange using CIM

CIM UCTE Profile enables data exchange with

- IOP participants
PSS/E, Eurostag, SPIRA, ISPEN, e-Terra Solutions, PSS/ODMS, ...
- CIM supporting tools
PSLF, Integral/DVG, DE Network Manager, ...

☹️ CIM UCTE Profile

- replaces proprietary formats
- is supported by a wide range of software packages
- leads to proven quality of data exchange filters
- supports both, Planning and Operation



CIM Roadmap and Expectations

EPRI Project CIM for Dynamic Models

- DlgSILENT is active member
- PowerFactory will support import/export of standard and user-defined models
- IOP this year

Expectations / Business Values:

- CIM must receive high level of acceptance
- CIM preferably as a unique world-wide data exchange format
- CIM must cover full range of standard applications
 - Load Flow & Short Circuit
 - Dynamics (RMS + EMT)
 - Harmonics
 - Reliability
 - Protection
 - ...



Data Management in PowerFactory

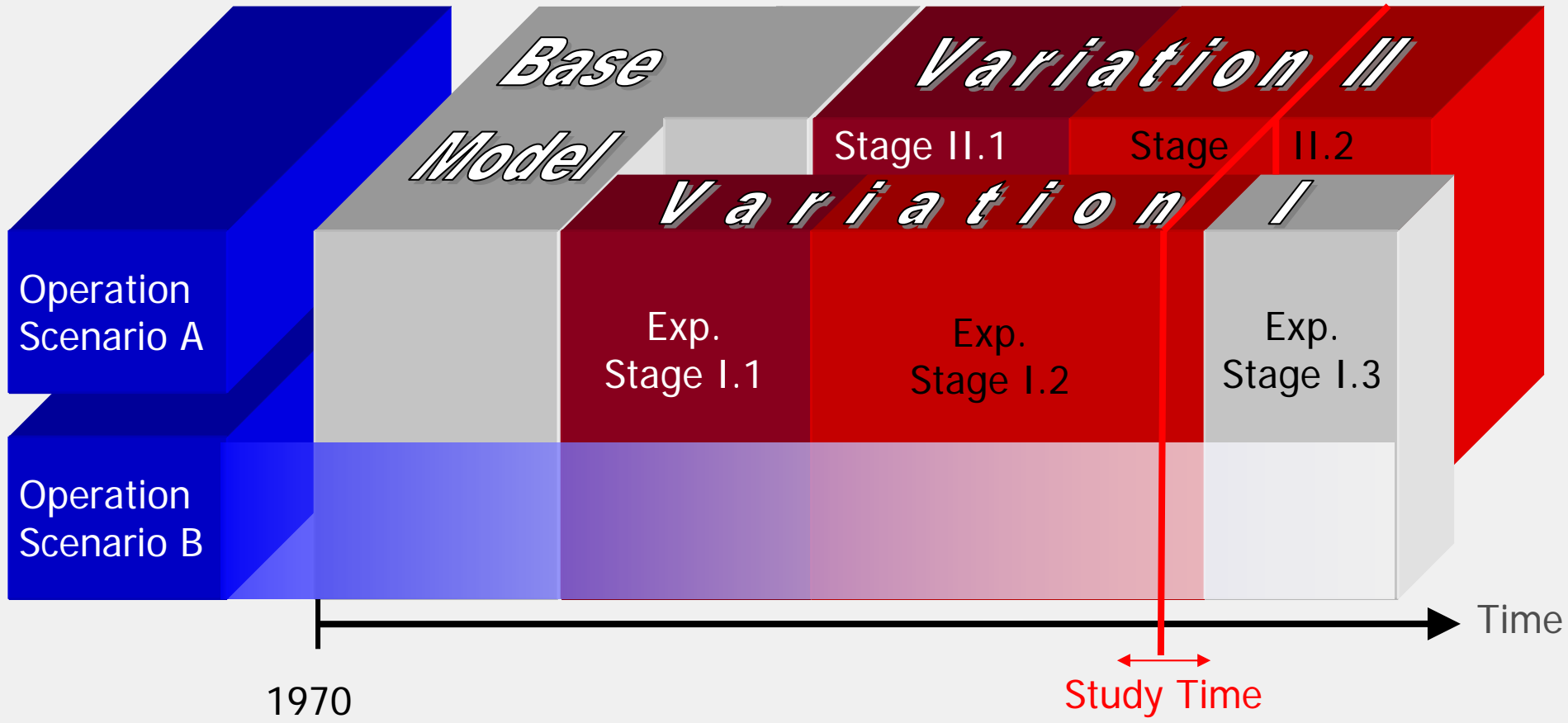
Main Features

- Network data stored in single or multi-user database
- Network Modeller incl. Single Diagrams and Block Diagrams
- Network Variations for expansion planning
- Operation Scenarios for operational data
- Network Model Versioning
- Network Model Sharing in multi-user environment
- User accounts, user groups, access rights
- Compare and Merge Tool
- Change Tracking

☹ **Integrated Comprehensive Network Model Management**

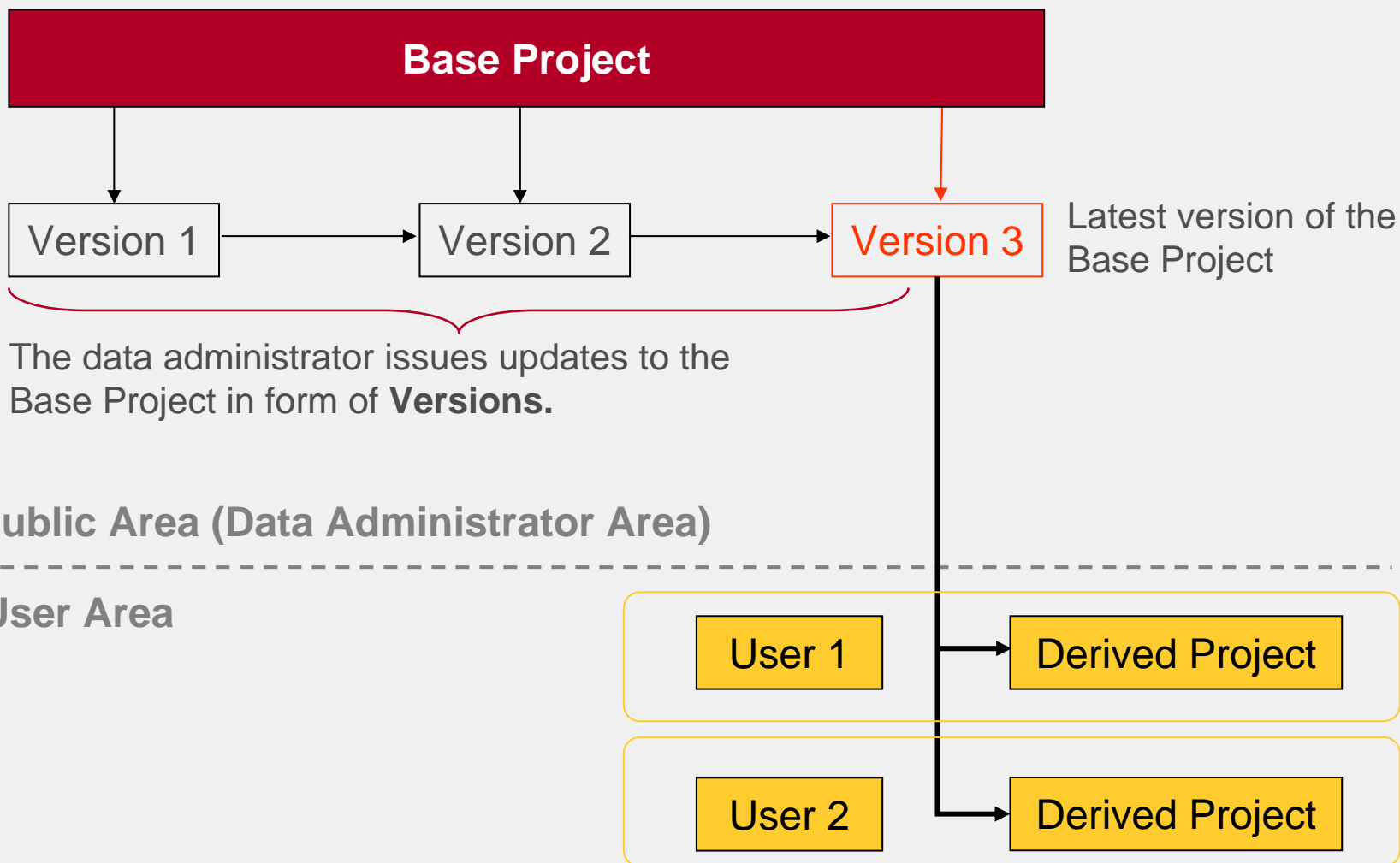


Operation Scenarios and Expansion Stages





Base Project, Versions and Derived Projects





Data Management for UCTE DACF Process

Day Ahead Congestion Forecast (DACF)

- 27 TSOs exchange up to 24 files per day
- Operation planning for next day, load flow and contingency analysis
- UCTE-DEF will be replaced by CIM files
- Node & branch models are exchanged, containing only a few switches

Data Management Targets

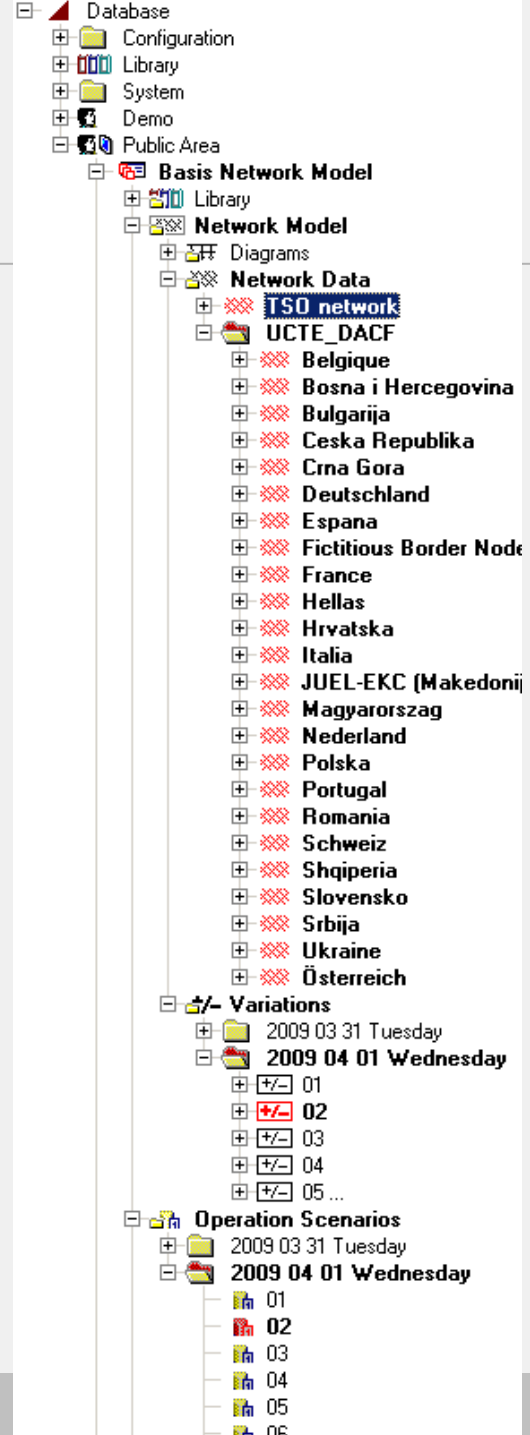
- Maintaining TSO's detailed network model (incl. substation diagrams) in multi-user environment, using variations and operation scenarios
- Asset management and control room using the same network model
- Importing hourly based network model of other TSOs
- Enabling load flow and contingency analysis for 24 scenarios



DACF Data Management in PowerFactory

DACF data import leads to

- 24 network variations containing topological changes (Node & Branch)
- 24 operation scenarios containing operational data
- Imported grids connected via X-Nodes to TSO owned network
- Selection of certain hour by Study Time modification
- Automated (n-0) and (n-1) calculation for all 24 hours





Conclusion

**A powerful tool and
CIM data exchange enable
efficient Power System Analysis
for Planning and Operation**