

Paris Session 2022



Implementation of Protection Operation Analysis and Fault Management System Based on Fault Data Aggregation and Detailed Digital Simulation

B5-PS3 10377

Question 3.06: What are your experiences to monitoring of IEC 61850 based PCAS and how you secure the operation of critical infrastructure and respond to the incidents?

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Russia

Group Discussion Meeting



СИСТЕМНЫЙ ОПЕРАТОР
ЕДИНОЙ ЭНЕРГЕТИЧЕСКОЙ СИСТЕМЫ
RUSSIAN POWER SYSTEM OPERATOR

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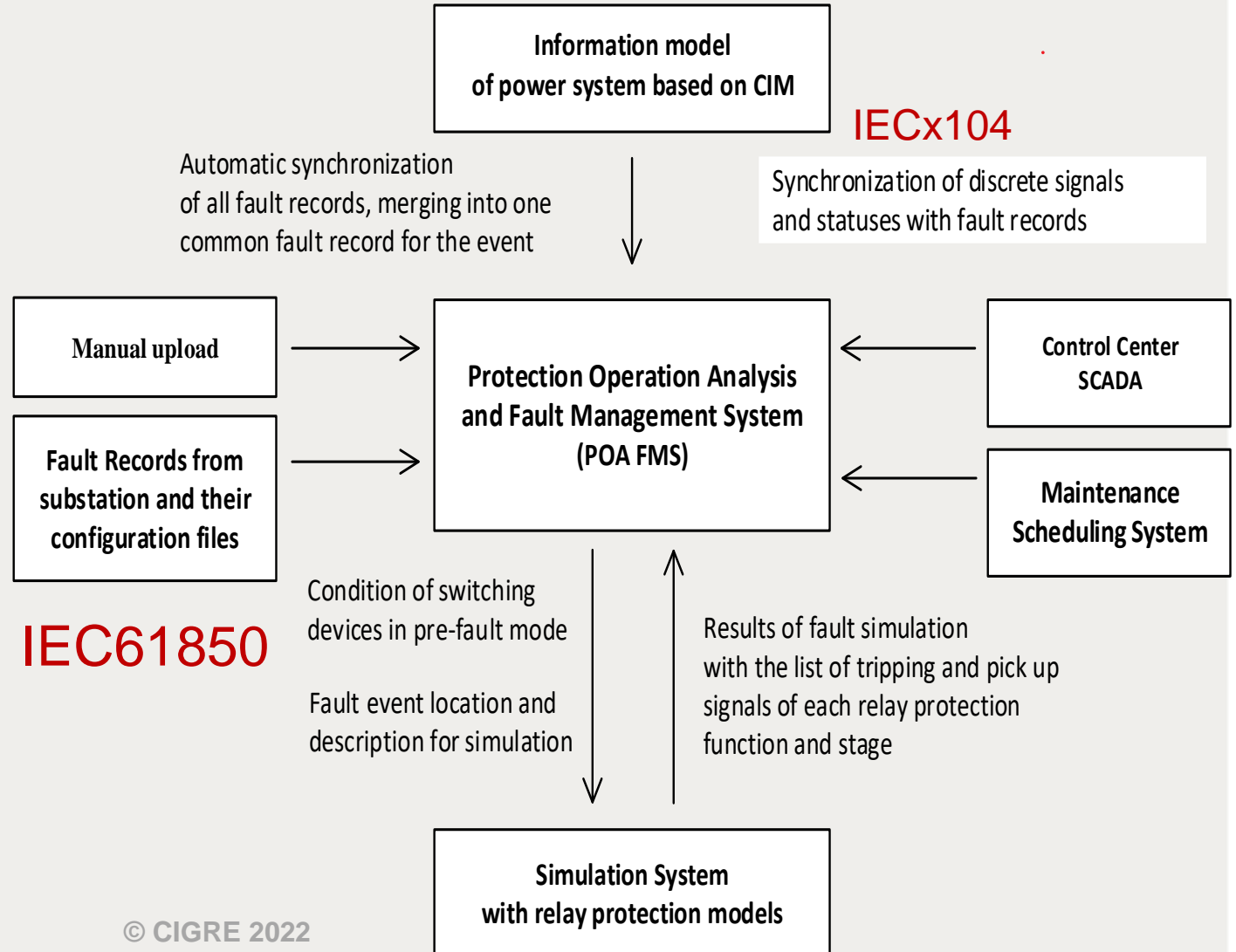


Protection Operation Analysis and Fault Management System Deployment

Key features:

1. automation of data collection
2. data synchronization from SCADA, digital fault recording functions, CIM-based simulation tools
3. aggregation and post-processing of discrete signals, SCADA values, fault recordings and calculated values from transients and short circuits simulation
4. automation of fault event analysis and evaluation of protection devices/functions operation.

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Experience to monitoring of PCAS with and w/o IEC 61850

Substation

Control Center

PCAS IEC61850

COMTRADE

Settings values,
Configuration

Future work

Pre- processing 1

PCAS w/o IEC61850

COMTRADE

Settings
Docs, sheets

Pre- processing 2

Manual Upload

POA FMS

API - Single point of Data Input

aggregation and synchronization even w/o GPS
automation of fault event analysis of protection devices
functions operation,
independent on communication protocol with PCAS

Power system Simulation with
detailed protection models

Requirements for protection
operation

Fault data

Equipment statuses
on pre-fault
conditions

List of protection
devices and
functions
in service

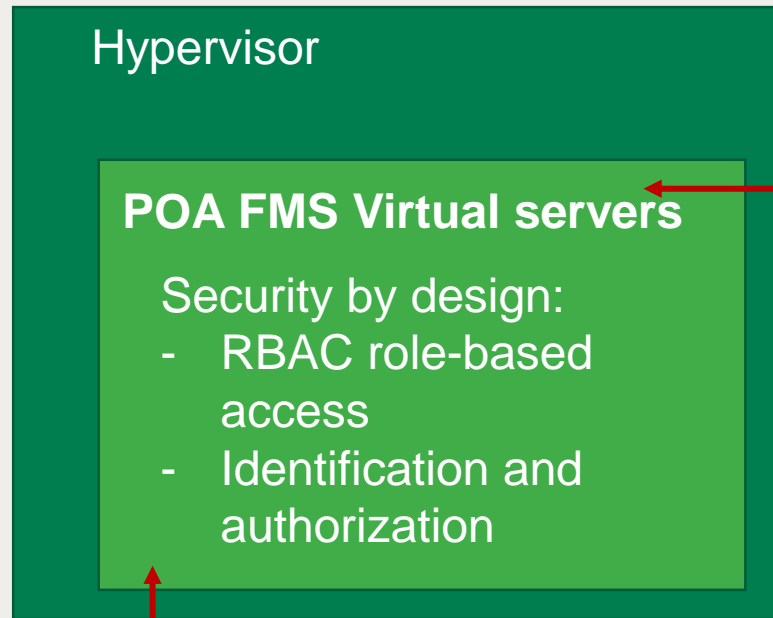
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102	102-1	ABB	102-1	OK	102-1
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104	104-1	ABB	104-1	OK	104-1
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106	106-1	ABB	106-1	OK	106-1
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108	108-1	ABB	108-1	OK	108-1
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110	110-1	ABB	110-1	OK	110-1

\underline{U} and \underline{I} during fault conditions

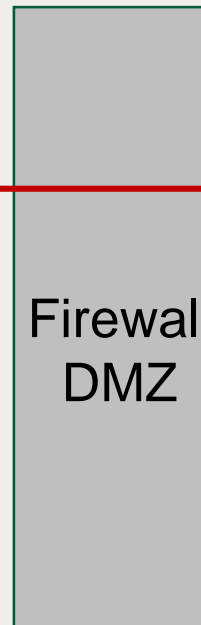
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108	108-1	ABB	108-1	OK	108-1
109	109-1	ABB	109-1	OK	109-1
110	110-1	ABB	110-1	OK	110-1

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Infrastructure for Protection Operation Analysis and Fault Management System



Input data from
- SCADA
- Internal systems
(Planning, Simulation)



Initial data from
external fault data collection systems

No additional costs for cybersecurity
on Control Center level

No control signals coming
from POA FMS to equipment
– the System is not part of critical infrastructure

Data flows are read only (data diode)
from critical infrastructure from Substation level

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