



Cigre Study Committee D2

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP (1)

JWG* N° D2/C2.41	Name of Convener : Alberto Del Rosso (USA) E-mail address: adelrosso@epri.com
Technical Issues # (2): 9, 8	Strategic Directions # (3): 2
The WG applies to distribution networks (4): Yes	
Title of the Group: Advanced Utility Data Management and Analytics for Improved Situational Awareness of EPU Operations.	
<p>Scope, deliverables and proposed time schedule of the Group :</p> <p>Background :</p> <p>In general terms, situational awareness (SA) means having an understanding of what you need to know, have control of, and conduct analysis in real-time to identify anomalies from normal patterns or behaviors that can affect the outcome of a business or process.</p> <p>SA is a key factor in preserving power system operation security, as it enables effective and timely decision-making and remedial reactions by the operator to an incident. Insufficient situation awareness results in a delayed, incorrect or deficient response, jeopardizing power system secure operation. Indeed, the lack of awareness of deteriorating conditions has been identified as one of the main causes of several electrical disturbances and black outs in the last decade. SA is all the more important in large integrated systems where the System Operator (SO) only has direct control of a small part of the network.</p> <p>From the power system operation viewpoint, SA implies not only having an understanding of the current state, but also the ability to anticipate system changes and their impact on system security. Conventional solutions for on-line SA improvement are primarily based on model-based simulation software aimed to assess potential critical conditions and to determine the necessary preventive/corrective actions to mitigate the adverse effects. However, today's availability of a wide variety of data from advanced sensors and monitoring systems opens up the possibility to improve SA through advanced data analytics and visualization solutions able to synthesize actionable information from the raw data. Important data sources that can potentially be used for this purpose include phasor measurement units (PMUs), intelligent electronic devices (IEDs), digital fault recorders, power quality monitors, line sensors, equipment sensors, geographic information systems (GIS), lightning detection systems, weather systems, infrared sensors, arcing detection sensors, etc.</p> <p>In order to enable the use of such data sources to effectively support system operations a platform to automatically ingest, manage, and analyze large, complex data volumes in real-time is needed. Data from disparate sources and systems must be integrated, mined, and correlated. New data management architectures, data integration and database technology are needed for this purpose. There is also a need to develop applications which utilize these heterogeneous and large volumes of data and provide decision support to the SO.</p> <p>Objective:</p> <p>The objective of this Working Group is to survey and examine current practices, industry trends, and new research on the use various data sources and applications to enhance situational awareness, as well as the data integration and management technologies to</p>	

facilitate effective implementation in the control room.

Scope:

1. Synchrophasor-based applications for power system stability, system dynamic trends, signature of events, security margins, and baseline assessment.
2. Use of asset/equipment health and condition information in the control center to facilitate decision-making.
3. Innovative data analytics methodologies and software tools to identify patterns and reveal critical factors for controlling the power grid under a variety of normal and contingency operating conditions.
4. Approaches for data management and data ingestion from multiple sources to enable data-intensive applications for situational awareness improvement. Data sources include but are not limited to components and network sensors, digital relays, digital fault recorders, PQ recorders, weather data, PMUs, physical security data.

Deliverables:

- Report to be published in Electra or technical brochure with summary in Electra
- Contribution to Cigre events

Time Schedule:

TOR Approved: Q1 2015

Initial Meeting of WG: Q2 2015

Final report: Q3 2017

Comments from Chairmen of SCs concerned :

Approval by Technical Committee Chairman :

Date : 17/04/2015



- (1) Joint Working Group (JWG) - (2) See attached table 1 – (3) See attached table 2
(4) Delete as appropriate

Table 1: Technical Issues of the TC project “Network of the Future” (cf. Electra 256 June 2011)

1	Active Distribution Networks resulting in bidirectional flows within distribution level and to the upstream network.
2	The application of advanced metering and resulting massive need for exchange of information.
3	The growth in the application of HVDC and power electronics at all voltage levels and its impact on power quality, system control, and system security, and standardisation.
4	The need for the development and massive installation of energy storage systems, and the impact this can have on the power system development and operation.
5	New concepts for system operation and control to take account of active customer interactions and different generation types.
6	New concepts for protection to respond to the developing grid and different characteristics of generation.
7	New concepts in planning to take into account increasing environmental constraints, and new technology solutions for active and reactive power flow control.
8	New tools for system technical performance assessment, because of new Customer, Generator and Network characteristics.
9	Increase of right of way capacity and use of overhead, underground and subsea infrastructure, and its consequence on the technical performance and reliability of the network.
10	An increasing need for keeping Stakeholders aware of the technical and commercial consequences and keeping them engaged during the development of the network of the future.

Table 2: Strategic directions of the TC (cf. Electra 249 April 2010)

1	The electrical power system of the future
2	Making the best use of the existing system
3	Focus on the environment and sustainability
4	Preparation of material readable for non technical audience