



CONSEIL INTERNATIONAL DES GRANDS RÉSEAUX ÉLECTRIQUES
INTERNATIONAL COUNCIL ON LARGE ELECTRIC SYSTEMS

STUDY COMMITTEE D2
INFORMATION SYSTEMS AND TELECOMMUNICATION

Study Committee D2 Annual Report 2012

Mr. Maurizio MONTI – SC D2 Secretary

INTRODUCTION

SC D2 is focused on the study of Information Systems and Telecommunication technologies and their application in the Power Utility environment.

SC D2 mission is:

- To facilitate and promote the progress of engineering and the international exchange of information and knowledge in the field of information systems and telecommunications for power systems;
- To add value to this information and knowledge by means of synthesizing state-of-the-art practices and drawing recommendations.

The evolution of the Power Utilities in all their activities has been linked to the evolution of the information and telecommunication systems, offering new opportunities, new capabilities, new capacities thereby allowing the utilities to be more efficient in their core business. In fact, IT and Telecom play a capital role in the evolution of Power Systems. The deployment of new advanced functionalities such as the Smart Grid architecture, Distributed generation, Power System Efficiency optimization, etc. will only be possible with the latest generations of Information Systems and Telecommunication technologies.

As defined by Cigré structure, SC D2 is a horizontal SC which means that its goal is to interact with the rest of SCs in order to gather their specific requirements and disseminate the knowledge and capabilities in the field of Information and Telecommunication technologies.

The member of the SC D2 come from Power Utilities, manufacturers, consultants and research institutes. The balance between Information Technology and Telecommunication specialist guarantees a seamless approach to the Power utility challenges.

STRATEGIC DIRECTION

The SC D2 Strategic Plan (2012-2021) defines the organization of the SC D2 to cope with the following objectives:

- To be more customer oriented;
- To foster the participation in the working bodies;
- To be well balanced between information systems, telecommunications, telecontrol and automation;
- To draw the interest of the customers for the work done in the SC.

The following technical and administrative directions have been defined in the SC D2 Strategic Plan:

- TD 1: Core Telecom network technologies to cope with new requirements.

- Studying and considering telecommunication technologies and architecture evolution and how these changes may respond to the challenges and requirements of the new generation of ITS.
- Technologies and architecture to assure business continuity and disaster recovery is an issue that has to be considered when a new architecture or technologies is being assessed.
- TD 2: New operational and maintenance concepts and requirements.
 - Maintenance scope, techniques and tools when deploying new technologies and architectures implementing new services.
- TD 3: Strategies to deploy the network of the future.
 - Detailed analysis of the numerous challenges introduced by the smart grid.
- TD 4: IT Security.
 - Overcoming security threats is a key issue in the deployment of the networks of the future and especially in the future Smart Grids.
- AD 1: Widen Study Committee influence.
 - Attracting members from non-represented NCs, vendors and Universities.
 - Improving relationship with related organizations.
 - Producing position papers on key issues will position SC D2 in a leading position in our field of influence.
- AD 2: SC D2 member's involvement.
 - Members required
 - Volunteers to collaborate in well defined tasks, position papers, technology reports, etc.

These directions are aligned with the Strategic Directions defined by Cigré:

- Networks of the Future.
 - Core Telecom network technologies
 - Strategies to deploy new Technologies
 - New IT operational architecture
- Energy Efficiency support
 - New applications to improve efficiency
 - New telecom architectures and technologies
- Common aspects
 - New operational and maintenance concepts and requirements
 - Technologies and architecture to assure business continuity and disaster recovery

TECHNICAL ACTIVITIES

The activities carried out by the SC D2 are aligned with the strategic directions and can be classified into the following four technical activities:

TD 1 - Core Telecom network technologies to cope with new requirements.

The Power system of the future will massively require information sharing between different stakeholders. The implementation of such new approach will require the adoption of new generation of Information system and Telecommunication networks. The adoption of new network architectures and telecommunication technologies should consider the application of optical multiplexing, the deployment of all optical networks and new networking technologies.

Technologies and architecture to assure business continuity and disaster recovery is an issue that has to be considered when a new architecture or technologies is being assessed.

TD 2 - New operational and maintenance concepts and requirements

Deploying new technologies and architecture and implementing new services will require the revision of maintenance scope, techniques and tools. New operational concepts and technologies will introduce the need for Information and Telecommunication technologies able to support these new concepts.

TD 3 - Strategies to deploy the network of the future

Building new telecom infrastructure in a sustainable way introduces many challenges that have to be carefully analysed. Sharing infrastructures is a feasible way but requires thoroughly analyse regulations, new operational modes, new management schemes, etc. Service modelling to provide a straightforward integration of new Information technologies and the new operational architecture required by the networks of the future is also a relevant topic to be considered.

TD 4 - IT Security

Overcoming security threats is a key issue in the deployment of the networks of the future and especially in the future Smart Grids. Assessing security risks, defining the proper security framework, architecture and best practices in the scope of legal requirements and other internal practices of the Power Utilities is a key topic to be developed. Deploying security over all the aspects of Power System protection, control and operation is a strategic issue included in this technical direction. The study of international standards and their applicability to Power Utilities is also an aspect to be considered.

AD 1 and AD 2 - Widen SC influence and member's involvement

As part of its mission, the SC D2 maintains relationship with a number of different international organisations. Thanks to this, Power Utilities IT and Telecom requirements and practices can be shared in other forums contributing to a better understanding and communications outside Cigré.

MEETING AND EVENTS

SC D2 Discussion Meeting - Paris

The Preferential Subjects of the 2012 SC D2 meeting were:

- PS1 – “Distributed Information platforms for the power systems of the future”.
 - New architecture for operation information systems
 - Back-up systems and recovery systems
 - Cloud computing in applications and shared services platforms
 - Cyber security
- PS2 – “Interconnected information systems to support competitive markets”.

New market-driven solutions
 New solutions for communication
 Risks and opportunities

A total of 22 papers were reviewed in the Special Report prepared by Mr. L. Lhassani and Mr. I. Nedelcu and attendance presented a total of 64 contributions (39 prepared contributions and 25 spontaneous contributions). The SC D2 Discussion Meeting attracted about 150 persons.

RECENTLY COMPLETED WORK

SC D2 published in 2012 three Technical Brochures:

- **TB 495, WGD2.29 – “Communications Access to Electrical Energy Consumers and Producers”**. This TB examines communications access to consumers and producers in the context of the vision for Smart grid. In developing this technical brochure, the WG has defined the Smart grid and developed a view of the evolutionary process which could lead to implementation. Communication technologies have been considered as part of the development, indeed they are considered to be the key enabler for smart energy networks.
- **TB 507, WGD2.28 – “Communication architecture for IP based substation applications”**. The main objective of this TB is to describe a high-level architecture for IP communications of HV substation applications covering all services which require connectivity beyond the substation perimeter. This TB provides guidelines for selecting and implementing IP based network architectures that fulfill the reliability, availability, maintainability and security requirements of Electrical Power Utilities.
- **TB 521, JWGD2/B5.30 – “Line and System Protection using digital circuit and packet communications”**. The main objective of this TB is the integration of the protective relay system communications with those of other power applications over a shared network generates potential anomalies impacting the performance of the protection application. This TB examines the usage of both synchronous time multiplexed and packet switched communication channels for protective relays together with theoretical analysis and practical design rules and precautions to overcome communication anomalies.

The respective WGs having completed their work have been dismantled in 2012.

FUTURE ACTIVITY

New WGs aligned with the above-mentioned Strategic Direction have been launched in 2012:

- **WGD2.32 “Optical Cables Links in Power Utilities - Mounting, Commissioning, Maintenance and Management”**. The scope of this Working Group is to collect experiences and requirements for assembly, commissioning and maintenance of fiber optic cable and telecommunications equipment, that allow to identify and analyze most common failures and possible solutions to them, including the use of new tools like Supervision and Management Systems of cables and equipment.

- **WGD2.33 “Operation & Maintenance of Telecom network and associated information systems in the Electrical Power Utility”.** The scope of this Working Group includes the aspects related to the impact of Organizational Perimeter on Telecom Operation & Maintenance process, Telecom Operation Support Systems and associated management tools.
- **WGD2.34 “Telecommunication and Information Systems for Assuring Continuity and Disaster Recovery”.** The scope of this Working Group is to classify different types of disasters and include those aspects that influence the continuity of the service and shorten outage recovery.
- **WGD2.35 “Scalable Communication Transport Solutions over Optical Networks”.** The introduction of smart applications in the electrical power utility and consequent dispersed intelligence results in a tremendous growth of information exchange across the power system. The scope of this Working Group is to identify and analyze alternative solutions and migration plans to cope with the scalability demands and new application requirements in order to guarantee Utility’s capability to maintain the system’s operation.
- **JWGB5/D2.46 “Application and management of cyber security measures for Protection & Control systems”.** The scope of this Working Group is to focus on the available standards and to determine how they can effectively be deployed and managed by protection and control engineers for digital substation automation (DSAS) and protection relays, and whether the security breaches on protection and control applications are mitigated by their respective recommendations. Outputs from other Cigré WGs, WGB5.38 “The Impact of Implementing Security Requirements using IEC 61850”, WGD2.22 “Information Security for Electric Power Utilities” and WGD2.31 “Security architecture principles for digital systems in Electric Power Utilities (EPU)” will be used.
- **WGD2.36 “Communication solutions for information exchange in the smart delivery of electrical energy”.** The interest for smart grid applications has grown substantially in recent years. Implementing the underlying information exchange infrastructure and the adequate blending of communication solutions and technologies are however some essential issues of concern, the objective being to avoid the pitfalls of excessive investment for unused communication capability or on the opposite side, insufficient communication capability for planned applications. The scope of this Working Group is to provide a comparison of experiences, assessments, implementation scenarios and migration plans for the communication infrastructure in order to prepare guidelines for the electrical power utilities that are planning the deployment and/or evolution of their telecom infrastructures for information exchange in the smart delivery of electrical energy.

At the moment of preparing this report, new WG aligned with the above-mentioned Strategic directions is in the process of being launched.

- **Guidelines for outsourcing managed security services.** This Working Group should provide guidelines for an electricity utility to tailor outsourced managed security services using cloud technologies for smart grid applications.

SC D2 can provide tutorials and workshops on Information technology and Telecommunication. Such events are typically organized by Cigré national Committees. Please contact the SC Chairman Carlos Samitier, or the SC Secretary Maurizio Monti for further information. Contact details can be found on D2 web page d2.cigre.org.