Global Standardization Activities

Activities and Status of Focus Group on Smart Grid in ITU-T

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Abstract

This article describes the current status of the Focus Group on Smart Grid, which was established by ITU-T (International Telecommunication Union, Telecommunication Standardization Sector) in 2010, as initial study activities related to the Smart Grid, especially from the perspective of information and communications technology (ICT).

1. Introduction

The Smart Grid is a new electricity network that highly integrates advanced sensing and measurement technologies, information and communications technologies (ICTs), analytical and decision-making technologies, and automatic control technologies with energy and power technologies and the electricity grid infrastructure*. With energy and environmental issues becoming more important recently, various efforts related to the Smart Grid are being conducted around the world.

The establishment of the Focus Group on Smart Grid (FG Smart) [1] was officially approved in the ITU-T TSAG (International Telecommunication Union, Telecommunication Standardization Sector, Telecommunication Standardization Advisory Group) meeting held in February 2010 [2]. It followed on from discussions at an earlier meeting—the first ITU-T CTO (Chief Technology Officer) group meeting held in October 2009—about ITU-T's role in the field of smart grids as a hot topic of ICT. Because the technical area covered by smart grids is very wide ranging, FG Smart was established under TSAG to deal with issues related to multiple ITU-T Study Groups (SGs). Incidentally, the February 2010 TSAG meeting also officially approved the establishment of FG Cloud (Focus Group on Cloud Computing).

2. Management structure

After the February 2010 TSAG meeting, the Chairman and Vice-Chairman of FG Smart were nominated and approved by April 2010, and the first meeting of FG Smart was held in June 2010 in Geneva under a management structure consisting of one chairman (Germany) and three vice-chairmen (China, Japan, and Korea). Furthermore, in this first meeting, another vice-chairman from NIST (National Institute of Standards and Technology), which has had a lot of achievements in the smart grid area, was proposed by the chairman and approved. As a result, the management structure currently consists of one chairman and four vice-chairmen.

3. Activities

FG Smart has held seven official meetings to date. Its initial period was one year, so the seventh meeting held in June 2011 on Jeju Island, Korea, would have been the last one; however, the February 2011 TSAG meeting approved a half-year extension to enhance the output documents and promote collaboration with other standardization bodies. The meetings that have been held and are currently scheduled are listed in **Table 1**.

In the first FG Smart meeting, standardization development organizations (SDOs) and industry

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* The definition of Smart Grid is currently under discussion at ITU-T FG Smart.

Table 1. Meetings of FG Smart.

	Date	Place	Notes
1st	June 14–16, 2010	Geneva, Switzerland	
2nd	August 2–5, 2010	Geneva, Switzerland	Establishment of three WGs
3rd	October 11–15, 2010	Geneva, Switzerland	
4th	November 29 to December 3, 2010	Chicago, USA	Joint with SGIP/Grid-Interop2010
5th	January 10–14, 2011	Yokohama, Japan	Workshop and tours to experimental project in Japan
6th	April 4–8, 2011	Sophia Antipolis, France	Joint with ETSI Workshop on Smart Grid
7th	June 9–15, 2011	Jeju Island, Korea	
8th	August 22–26, 2011	Geneva, Switzerland	
9th	December 18–22, 2011	Geneva, Switzerland	Final meeting

groups such as NIST, ETSI (European Telecommunications Standards Institute), IEC (International Electrotechnical Commission), IEEE (Institute of Electrical and Electronic Engineers) and ZigBee Alliance introduced contribution documents that described their activities and outcomes. Participants discussed the target of FG Smart and methods of investigation, for example, the advantages and disadvantages of a vertical approach to studying each application related to smart grids and a horizontal approach to studying common issues such as smart grid architecture and requirements. As a result of this discussion, the second FG Smart meeting (August 2010), approved the establishment of three Working Groups (WGs): the Use Cases WG, Requirements WG, and Architecture WG. Each WG will create an output document called a Deliverable. In addition, it was agreed that a Terminology deliverable would also be created as a common activity among these three WGs. Since then, FG Smart has mainly conducted studies on the basis of contribution documents that proposed input texts for each deliverable in the corresponding WG meeting; in practice, however, the WG meetings have been held sequentially during the FG Smart meeting so that all FG Smart meeting participants could discuss and study all of the deliverables. The WG structure and the deliverables are listed in **Table 2**.

The fourth FG Smart meeting in Chicago, USA, and the sixth meeting in Sophia Antipolis, France, were held jointly with other conferences relevant to smart grids at the same locations in order to enhance interaction among participants of both. This is one of the features of FG activities: they are usually disclosed to even non-ITU-T sector members.

The fifth meeting was held in Yokohama, Japan, hosted by Mitsubishi Electric. In addition to the regular meetings, a workshop conference and tours to a smart house experimental project in the Minato-Mirai

Table 2. Structure of WGs and Deliverables.

	Output documents (Deliverables)
WG1	Use Cases
WG2	Requirements
WG3	Architecture
Ad hoc	Terminology
Plenary	Overview

area of Yokohama supported by the Japanese Ministry of Internal Affairs and Communications (MIC) were provided to highlight Japan's efforts in the smart grid area.

4. Overview of studies

In the Use Cases WG's study activities, NIST's knowledge base called IKB (Interoperability Knowledge Base) [3], which was derived through its significant efforts, is considered to be a very important and useful information source. The high-level use-case categories currently proposed on the basis of IKB and input contribution documents to the Use Cases WG are listed in **Table 3**. For each category, detailed and specific use cases are being organized in a table format that includes items such as Actors, Domains, and Exchange Information. So far, many use cases, especially ones corresponding to AMI (Advanced Metering Infrastructure), Existing User's Screens, Managing Applications through/by Energy G/W (gateway), and Electric Vehicle, have been proposed. For example, in the case of Existing User's Screens, many use cases about systems for visualizing energy consumption in houses have been proposed.

In the Requirements WG and Architecture WG, as study activities progress, a new issue has arisen: the contents and scope of each deliverable should be

clarified and organized. To deal with this issue, the fourth meeting in Chicago approved the creation of a new Overview deliverable describing the basic concept of smart grids, goal of FG Smart, relationship with other SDOs, architecture overview from an ICT

perspective, and so on.

The conceptual model of smart grids in this Overview deliverable refers to NIST's seven-domain model already incorporated in the activities of various SDOs. The Architecture overview is based on the three-layer (Service/Application, Network, and Energy) model proposed by ETSI with some modifications for the ICT perspective (**Figs. 1** and **2**).
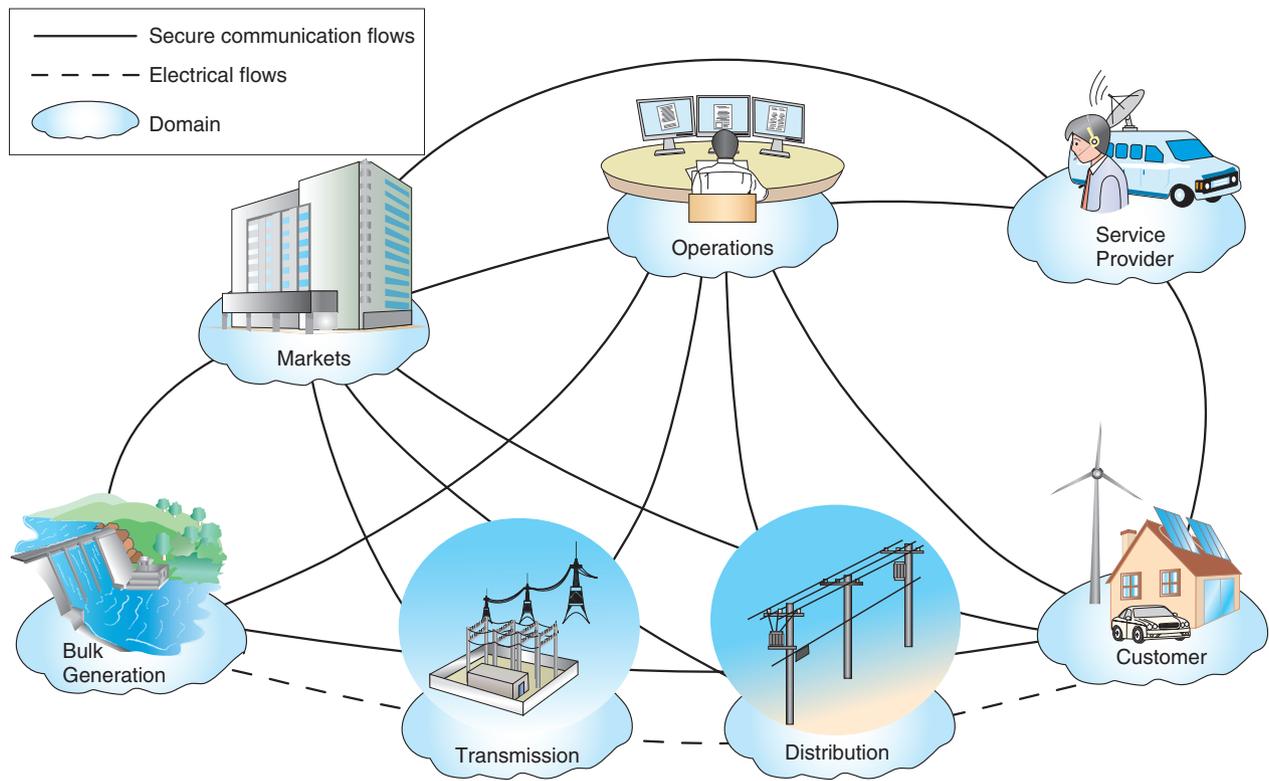
Currently, the Requirements and Architecture deliverables are being created in the manner of a breakdown Overview deliverable. In the case of the Architecture deliverable, a functional architecture model the same as the IPTV (Internet protocol television) architecture has been introduced (**Fig. 3**).

5. Future plans

Although the period of FG Smart has been extended to December 2011, all the deliverables will be sent to related SGs in ITU-T and other SDOs as liaison documents at the end of the eighth FG Smart meeting in August 2011. After that, with some feedback from

Table 3. High-level categories of use cases.

No	Title
1	Demand Response
2	WASA (Wide-Area Situational Awareness)
3	Energy Storage
4	Electric Transportation
5	AMI (Advanced Metering Infrastructure) systems
6	Distribution Grid Management
7	Market Operations
8	Existing User's Screens
9	Managing Appliances through/by Energy G/W
10	Electric Vehicle
11	Local Energy Generation/Injection

NIST Smart Grid Framework 1.0, January 2010.

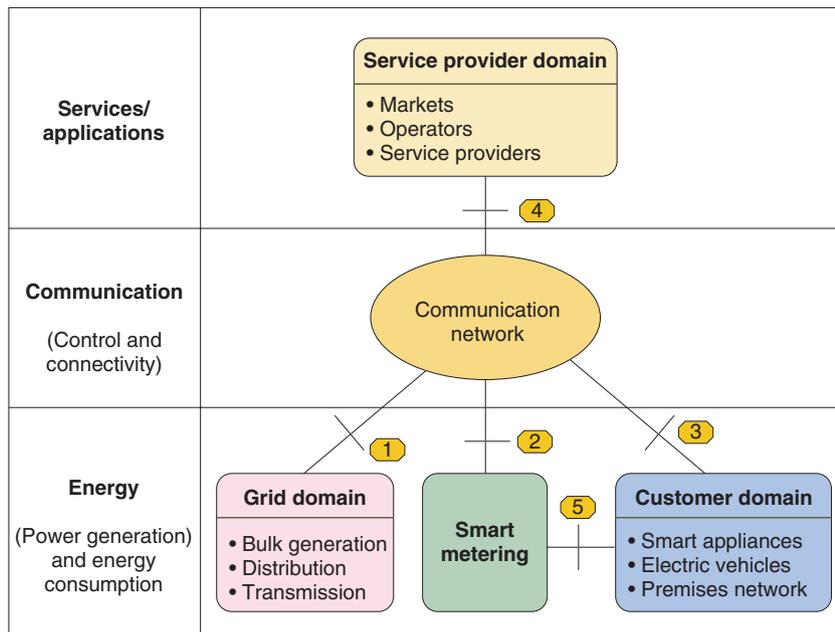Fig. 1. Conceptual domain model of Smart Grid by NIST.

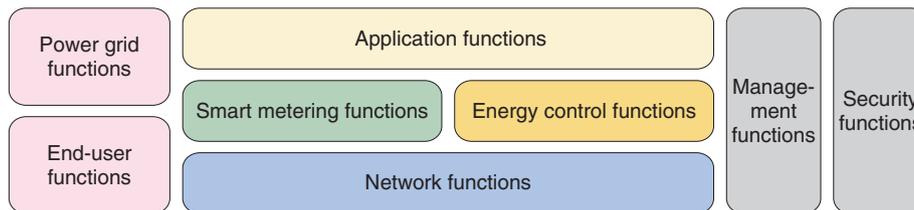Fig. 2.   Three-layer architecture model simplified with ICT perspective.

Fig. 3. Functional architecture model (under review).

ITU-T SGs and other SDOs, FG Smart will continue to edit and improve the deliverables and finalize them by the December 2011 meeting.

On the basis of FG Smart's output, a new study body for smart grids is scheduled to be approved in the January 2012 TSAG meeting. Since the technical area of smart grids is so wide-ranging, the candidates for this new body are expected to include a JCA (Joint Coordination Activity) or GSI (Global Standards Initiative), which are ITU-T study structures defined to span multiple SGs.

References

[1]   FG Smart. http://www.itu.int/en/ITU-T/focusgroups/smart/Pages/Default.aspx
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