

How data communication is used in a smart grid based power supply system?

In smart grid, efficient and reliable communication is incorporated to improve the efficiency, sustainability, and stability of the whole system. This paper presents a review on the different types of available communication methods and protocols which are used for data communication within and outside a smart grid based power supply system.

What is a smart grid communication system?

To support information collection, distribution and analysis, as well as automated control and optimization of the power system, we argue that the smart grid communication system will rely on two major subsystems: a communication infrastructure and a middleware platform.

What is the role of data communication and networking in smart grid?

Advanced data communication and networking techniques will play a key role in the successful development of the emerging smart grid system. The communication network in the smart grid must be able to support all aspects of generation, transmission, distribution, as well as the requirements of users and utility service providers.

Why is TCP a good choice for smart grid communication?

Since the majority of smart grid applications require reliable communications, TCP seems the natural choice also for the smart grid communication system. However, TCP does not provide guarantees on network delays experienced by transmitted packets. In addition, the timeouts used to detect some packet losses can cause noticeably delay spikes.

Are cellular M2M communications suitable for smart grid applications?

The authors argue that the cellular M2M communications technologies are suitable for smart grid applications such as wide-area situational awareness, interconnection of distributed energy resources, and distribution automation in the transmission and distribution networks.

Are cyber-vulnerabilities in the smart grid still a problem?

Although a considerable amount of research has been conducted in this field many open issues still exist because the increased interconnection and integration, e.g., between electric grid, monitoring and communication network, data management systems and applications, also introduce new cyber-vulnerabilities into the smart grid.

aspect in the smart grid environment, some studies also focus on cyber security standards. Authors in [15, 16] discuss security requirements, network vulnerabilities, attack countermeasures, secure communication protocols and architectures in the smart grid environment and analyze smart grid security standards.

Integrated Security for Smart Grid Management. An intelligent smart grid relies on real-time, high-bandwidth, two-way open communications to control and monitor power flows. These communications make the smart grid viable but also open ...

Smart grid. Smart Grid is an automated and broadly distributed energy generation, transmission and distribution network. It is characterized by full duplex network with bidirectional flow of electricity and information. It is a close loop system for monitoring and response [1]. Smart Grid is being conceptualized and developed by various

This article complements and extends other surveys carried out by various authors. Ramírez and Umaña (2015) presented communication technologies and routing protocols deployed in a neighbourhood area network for AMI. Fang et al. (2012) divided the entire smart grid into: the smart infrastructure system, smart management system and smart ...

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Another alternative is the Open Smart Grid Protocol (OSGP), or GS OSG 001, which has been published by the European Telecommunications Standards Institute (ETSI). It is mostly used in the Netherlands and in certain Middle East countries. It defines a series of specifications focused on the control of smart grid

In smart grids, digital communication technologies are used. In this chapter, we will be discussing about one of the very important concepts in digital communication, which is Internet Protocols and IP layers.. Internet protocols and IP layers are very important components of a digital communication system that provide end-to-end connectivity and specify how data should ...

With the ongoing trends in the energy sector such as vehicular electrification and renewable energy, the Smart Grid (SG) is clearly playing a more and more important role in the electric power system industry. One ...

The emergence of the smart grid has led to the development of a diverse set of standards and protocols for achieving interoperability among smart devices. These smart grid related standards and protocols cover a wide variety of power system components and functionalities. In this paper, a comprehensive review of commonly used standards and protocols in the smart grid ...

Smart grid networks, and Operational Technology (OT) networks in general, utilize a variety of communication protocols for low-latency control, data monitoring, and reporting at every level.

As a response to the need for intelligent control of EDN many researchers focus their efforts on the design and construction of SG systems and also in the last years are created a number of standards, related to those

problems [1]. The purpose of this article is to be stated and justified the need for the using intelligent metering devices combined with information and communication ...

The communication technology for power systems a major focus in the development and deployment of smart grid, the SCTP protocol, which was initially designed for transporting signaling messages ...

Present power grids are getting replaced by smart grids, mainly for improving performance of existing power grid. Integration of electrical, electronics and computer science have led this technology more popular. Smart grid technology is characterized by full duplex communication, automatic metering infrastructure, renewable energy integration, distribution ...

The objective of this chapter is to briefly review and discuss major standards, protocols, and challenges in the smart grid domain. This chapter first discusses major standards organizations, alliances and user groups, and open source groups dealing with smart grid standards in Section 3.1. Section 3.2 presents a comprehensive review of commonly used ...

Smart Grid Communications and Networking - May 2012. Introduction. Spread over the grid, sensors and sensor networks monitor the functionality and the health of grid devices, monitor operation conditions, provide outage detection, and detect power quality disturbances [1].

2.4 EV to Smart Grid Protocols. For successful integration of the EVs into the Smart Grid, a communication link between the EVs and the Smart Grid is required so that the Smart Grid can collect information about the SoC and other energy management-related sensory information. Several application-level messaging protocols based on open standards ...

protocols characteristics and the smart grid application communication requirements, Al-Ali et al. [22] planned an IoT structure for the smart grid by devoting an IP address to each of the interactive

978-1-107-01413-8 - Smart Grid Communications and Networking Ekram Hossain, Zhu Han and H. Vincent Poor Frontmatter ... 1.6.2 Protocol security 24 1.6.3 Network-wise security 25 1.7 Open issues and future research directions 26 1.7.1 Cost-aware communication and networking infrastructure 26

Nowadays, several smart grid solutions have been proposed to improve electrical power systems. These solutions are based on a stronger, faster and more reliable network communication. Analyzing communication requirements is one of the first step in deploying a smart grid solutions, such as new applications and systems. However, this is normally not taken into account as ...

Since the smart grid deals with a large mass of data and critical missions, it requires ubiquitous, reliable, and real-time communication. The Internet of Things (IoT) technology, which has the ...

Smart Grid Standards and Protocols The term smart grid refers to a next-generation electrical grid that uses advanced information, communication, and computing technologies to operate more efficiently. These technologies also provide tremendous economic and environmental benefits to the electrical grid. With emerging smart grid technologies, the ...

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Fred Baker, SGIP voting member representative for the IETF and one of the lead authors of the document, said, "While it is unlikely that any part of the Smart Grid would be directly attached to the Internet per se (if they use the Internet, it would be through a Virtual Private Network or be for non-mission-critical communications), the Smart ...

ANTD in collaboration with the Engineering Laboratory has been engaged in research and development towards promoting interoperable communication networking protocols for smart grid. The main areas of activities are: Combined Grid communication Testbed Implementation for Real-time Measurement, Calibration, and Communication

The smart grid is expected to revolutionize existing electrical grid by allowing two-way communications to improve efficiency, reliability, economics, and sustainability of the generation ...

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