

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.

Do IoT-assisted Smart Grid systems need interoperability?

Interoperability In order to meet the diverse requirements of IoT-assisted SG systems, heterogeneous communication methods are required. In contrast to conventional telecommunication standards, the modern communication standards of IoT-assisted smart grid systems need interoperability among interfaces, message and workflows.

What is smart grid technology?

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 automation and complete monitoring and control of entire power grid.

Can optical fiber be used to provide smart grid services?

Recent studies are also expanding the scope of optical communications by proposing the use of optical fibers to provide smart grid services directly to end customers, although the cost of fiber installation is recognized as an obstacle for the adoption of this technology.

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.

Do smart grid applications have different latencies and communication reliability?

However, different smart grid applications may have different constraints for latencies and communication reliability. For instance, in basic metering applications a delay of few seconds when collecting metered data is tolerable, while applications monitoring transmission lines should operate on a time scale of few milliseconds.

The communication layer serves as the key enabler of various smart grid applications. Different communication networks in a smart grid environment can be classified, as shown in Fig. 2.2, by their coverage range and data rate. Customer premises area networks can be classified into home area network (HAN), building area network (BAN), and industrial area ...

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.

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ETHIOPIAN SMART METERING WORKSHOP Addis Ababa, Ethiopia - The Workshop on Smart Grid introduced participants to best practices in smart grid and advanced metering. Topics discussed included: Efficient and competitive technologies to tackle reduction of technical and commercial losses;

The Open Smart Grid Protocol (OSGP) is a family of specifications published by the European Telecommunications Standards Institute (ETSI) used in conjunction with the ISO/IEC 14908 control networking standard for smart grid applications. OSGP is optimized to provide reliable and efficient delivery of command and control information for smart meters, direct load control ...

The IEC 60870 consists of six parts of which the IEC 60870-5, known as the transmission protocols, is used in the smart grid [16,17,18,19,20,21,22,23,24,25,26,27,28]. It consists of the following separate documents: IEC 60870-5-1: Transmission Frame Formats, ... Smart grid communication technology has progressed over the past few decades, and ...

In smart grids, communication technologies use protocols to simplify data transmission between different power systems with the entire grid [10]. These protocols are rules governing messages as they move between entities; they function with avoidance of utilities operative cost without necessarily constructing devoted communication substructures.

It will greatly improve the system robustness and reliability by harnessing the modern and secure communication protocols, the communication technologies, faster and more robust control devices and Intelligent Electronic ...

2. Introduction: Smart Grid Communication Needs : High - speed Full integration two - way communication technologies to allow the smart grid to be a dynamic, interactive mega - infrastructure for real - time information and power exchange. Possible wired and wireless communication technologies can include: Multiprotocol Label Switching (MPLS): High - ...

In contrast to conventional telecommunication standards, the modern communication standards of IoT-assisted smart grid systems need interoperability among interfaces, message and workflows. Interoperability is also necessary for effective business rules, which poses a significant challenge due to the problems associated with multiple vendors ...

infrastructure, domains, architecture and applications. Section 3 presents smart grid communication technologies and network structures. Section 4 addresses challenges of smart grid communications, and privacy and security of smart grid communication. The organization of this paper is summarized in Figure 1. Figure 1. The structure of the paper 2.

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 ...

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.

presents different communication protocols used in smart grid technology. **KEYWORDS:** Smart Grid, WSN, Zigbee, WiFi, GSM I. **INTRODUCTION** The electrical grid is being revolutionarily transformed as Smart grid. Smart Grid is an automated and broadly distributed energy generation, transmission and distribution network.

Open Smart Grid Protocol (OSGP) provides the basis for delivering a reliable, scalable, high-performance infrastructure for smart metering and smart grid applications that can cost-effectively meet the needs of utilities today while giving them the headroom to add new devices and applications to their networks to solve whatever new challenges the future brings.

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Matching Performance Criteria of Grid Applications to Communication Technology . A wide variety of communication technologies support grid operations today via multiple solutions driven by the key factors above. Figure 2, below, shows a basic representation focusing on grid communications, which can be thought of as higher layer applications,

The rapid evolution of the smart grid has made the security and reliability of communication within the power system an urgent and critically important issue. To address this challenge, authentication and key agreement (AKA) protocols have gained significant attention and are regarded as indispensable tools for ensuring the secure operation of the smart grid. However, ...

By adopting a data-centric perspective we present a conceptual model of communication systems for smart grids, and we identify functional components, technologies, network topologies and communication services that are needed to support smart grid communications.

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.

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 ...

illustrates the protocols. Keywords: Load networks, smart grid, demand response, direct load control, communication and control protocol 1. INTRODUCTION The realization of the full potential of the Smart Grid heavily relies on information exchange between distributed nodes in this electric networked control system. These

It will greatly improve the system robustness and reliability by harnessing the modern and secure communication protocols, the communication technologies, faster and more robust control devices and Intelligent Electronic Devices (IEDs) for the entire grid from substation and feeder to customer resources .

