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IEEE Standard for Ubiquitous Green Community Control Network: Control and Management

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Abstract: This standard describes network gateway access, control, and management; specifies control and management requirements; defines the system architecture, communication sequences, and enhanced functions for the protocols defined in IEEE 1888™, "Ubiquitous Green Community Control Network Protocol"; and extends the protocols and interfaces based on the requirements. This standard shall provide enhanced protocols, workflows, and message formats for the network gateway under control and management, such as registration, access, control, event handling, configuration, status querying, etc.

Keywords: access, configuration, control, event handling, IEEE 1888.1™, management, running status

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Introduction

This introduction is not part of IEEE Std 1888.1-2013, IEEE Standard for Ubiquitous Green Community Control Network: Control and Management.

In an IEEE 1888 network, there are components [such as an application (APP), a gateway (GW) and storage, etc.] and sensors/actuators. GWs and sensors/actuators are the most popular facilities used in Ubiquitous Green Community Control Networks (UGCCNets). Sensors/actuators are data terminals that "generate" physical data or "accept" command data. GWs are used to relay data between sensors/actuators and other components, and data translation may be made during the transmission. GWs could be provided by different vendors or suppliers with different functions; therefore, they need to be managed to operate collaboratively. In this case, a consistent protocol, which is the essential task of this standard, is required.

This standard is based on IEEE Std 1888-2011 protocols, enhancing the management and control functionality of the network by extending the interfaces, protocols, and message formats, and focuses on the GW-related workflows for access, control, configuration, registration, running status, event handling, etc. Three aspects are included in this specification:

a) Specifying system architecture to manage and control GWs and the connected sensors/actuators

b) Providing methods to monitor GWs

c) Describing the communication processes that facilitate the operation abilities

In order to achieve effective network operation management, the management and control unit (MCU), which is responsible for the management of components (such as GW) access, control, and configuration, is introduced.

This document is organized as follows:

— Clause 4 specifies the general system architecture and typical communication sequences

— Clause 5 and Clause 6 describe the MCU and GW, respectively, which are key nodes in the GW control and management process

— Clause 7 focuses on the access, configuration, control, and management processes of the GW

— Clause 8 and Clause 9 describe the relevant interfaces and data structures that are extensions of IEEE Std 1888-2011

— Clause 10 describes the compatibility with IEEE Std 1888-2011

— Clause 11 describes the security considerations

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1. Overview

1.1 Scope

Based on the IEEE 1888™ protocols, this standard describes network gateway central access control and management policy through the extension of existing interface protocols, message formats, and interactive processing in ubiquitous green community control networks (UGCCNets). This standard extends the definition of the original interface protocols and message formats and mainly specifies the network gateway signal flow for access control, registration management, state querying, event reporting, remote management, etc.

1.2 Purpose

This standard aims to provide open and standardized network gateway management interface protocols for service providers, system integrators, equipment manufacturers, etc., through the extension of the original interface protocol in order to be able to remotely control and monitor the network gateway and other facilities in green communities, such as heating, ventilation, and air conditioning (HVAC); lighting systems; energy equipment; and so on.

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IEEE Std 1888™-2011, IEEE Standard for Ubiquitous Green Community Control Network Protocol.[1,2]

3. Definitions, acronyms, and abbreviations

For the purposes of this document, the following terms and definitions apply. The *IEEE Standards Dictionary Online* should be consulted for terms not defined in this clause. [3]

3.1 Definitions

management and control unit (MCU): Works as the central management unit for an IEEE 1888 network to provide services to other components and control/manage resources.

operation administration and maintenance (OAM): A module in an MCU that operates and maintains gateway (GW) and connected sensors/actuators.

operation service provider (OSP): A module in an MCU that provides services to components for common requests.

resource access manager (RAM): A module in an MCU that manages access control of components under MCU management.

3.2 Acronyms and abbreviations

AC module	access control module
ACL	access control list
APP	application
GML	gateway (GW)-Management List
GW	gateway
HVAC	heating, ventilation, and air conditioning
MCU	management and control unit
MIB	management information base

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