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SERIES Y: GLOBAL INFORMATION
INFRASTRUCTURE, INTERNET PROTOCOL ASPECTS
AND NEXT-GENERATION NETWORKS

Next Generation Networks – Service aspects: Service
capabilities and service architecture

Overview of Smart Farming based on networks

Recommendation ITU-T Y.2238

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Recommendation ITU-T Y.2238

Overview of Smart Farming based on networks

Summary

Recommendation ITU-T Y.2238 considers the actualized convergence service for agriculture, namely Smart Farming, as a solution to cope with various problems caused by severe conditions or the gap of viewpoints between people engaged in farming and IT engineers. In particular, this Recommendation defines service capabilities for Smart Farming, provides a reference model for Smart Farming, and identifies network capabilities required to produce an infrastructure which supports Smart Farming.

History

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Introduction

An actualized convergence service for agriculture is expected to bring more efficiency and quality improvement in production, distribution and consumption of agricultural products with the aid of IT information processing and autonomous control technologies.

However, there exist many difficulties to establish services and systems to actualize the convergence service in the agricultural field to cope with various problems such as time-varying weather changes, growth condition of farm products, and continual diseases or technical problems such as battery life and sensor malfunctions due to severe conditions. In addition, the gap of viewpoints between people engaged in farming and IT engineers may make it difficult to accomplish this mission.

Therefore, it is appropriate to consider an actualized convergence service for agriculture, namely Smart Farming, as a solution to cope with anticipated problems. In addition, the aspect of network capabilities to support this convergence service, where various types of networks, such as NGN, Future Networks and legacy networks, could be applied should be considered. This Recommendation develops a reference model, defines service capabilities and identifies network capabilities required to support such services.

Recommendation ITU-T Y.2238

Overview of Smart Farming based on networks

1 Scope

This Recommendation provides an overview of Smart Farming based on networks.

The scope of this Recommendation includes:

- Smart Farming reference model.
- Service capabilities required by Smart Farming.
- Network capabilities required by Smart Farming.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- [ITU-T Y.2002] Recommendation ITU-T Y.2002 (2009), *Overview of ubiquitous networking and its support in NGN*.
- [ITU-T Y.2060] Recommendation ITU-T Y.2060 (2012), *Overview of the Internet of things*.
- [ITU-T Y.2701] Recommendation ITU-T Y.2701 (2007), *Security requirements for NGN release 1*.
- [ITU-T Y.3041] Recommendation ITU-T Y.3041 (2013), *Smart ubiquitous networks – Overview*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 context [ITU-T Y.2002]: The information that can be used to characterize the environment of a user.

NOTE – Context information may include where the user is, what resources (devices, access points, noise level, bandwidth, etc.) are near the user, at what time the user is moving, interaction history between person and objects, etc. According to specific applications, context information can be updated.

3.1.2 object [ITU-T Y.2002]: An intrinsic representation of an entity that is described at an appropriate level of abstraction in terms of its attributes and functions.

NOTE 1 – An object is characterized by its behaviour. An object is distinct from any other object. An object interacts with its environment including other objects at its interaction points. An object is informally said to perform functions and offer services (an object which makes a function available is said to offer a service). For modelling purposes, these functions and services are specified in terms of the behaviour of the object and of its interfaces. An object can perform more than one function. A function can be performed by the cooperation of several objects.



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NOTE 2 – Objects include terminal devices (e.g., used by a person to access the network such as mobile phones, personal computers, etc.), remote monitoring devices (e.g., cameras, sensors), information devices (e.g., content delivery server), products, contents, and resources.

3.1.3 ubiquitous networking [ITU-T Y.2002]: The ability for persons and/or devices to access services and communicate while minimizing technical restrictions regarding where, when and how these services are accessed, in the context of the service(s) subscribed to.

NOTE – Although technical restrictions to access services and communicate may be minimized, other constraints such as regulatory, national, provider and environmental constraints may impose further restrictions.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 agricultural consumer: The service role that ultimately purchases the final agricultural products from distributors or agricultural producers.

3.2.2 agricultural distributor: The service role that distributes agricultural products supplied from agricultural producers through the distribution channel.

3.2.3 agricultural producer: The service role that actually produces agricultural products to be supplied to distributors or consumers.

3.2.4 Smart Farming based on networks: A service that uses networks to actualize a convergence service in the agricultural field to attain more efficiency and quality improvement and to cope with various problems.

NOTE – Problems may include such items as time-varying weather changes, growth condition of farm products, plant diseases, and technical problems, such as battery life and sensor malfunctions due to severe conditions. The service may overcome such problems with the aid of IT information processing and autonomous control technologies.

3.2.5 Smart Farming service provider: The service role that provides the requested Smart Farming services, such as providing a portal or consulting based on data gathered from agricultural fields, to requesting users.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

AAA	Authentication, Authorization and Accounting
API	Application Programming Interface
CCTV	Closed-Circuit Television
DC	Distribution Centre
GC	Gathering Centre
IoT	Internet of Things
IPv6	Internet Protocol, version 6
ISDN	Integrated Services Digital Network
IT	Information Technology
NGN	Next Generation Network
PSTN	Public Switched Telephone Network
QoS	Quality of Service