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NEXT-GENERATION NETWORKS, INTERNET OF
THINGS AND SMART CITIES

Internet of things and smart cities and communities –
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Requirements and functional architecture of smart fire smoke detection service

Recommendation ITU-T Y.4558



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Recommendation ITU-T Y.4558

Requirements and functional architecture of smart fire smoke detection service

Summary

The fire smoke detection service is usually deployed in indoor environments such as residential buildings, factories, shopping malls, hotels, office buildings, etc. With the development of society and economy, the fire smoke detection service is playing a more and more important role in people's life. However, there are some issues such as inefficient maintenance and management, non-real-time device failure detection, non-real-time fire alarm notification and poor service experience.

To address these issues, the smart fire smoke detection (SFSD) service not only detects smoke concentration through sensors, and triggers a fire alarm when it reaches a certain threshold to prevent disaster, but also uses the network to send the alarm information to the cloud platform, thus notifying relevant departments and personnel in time through web/APP/SMS/voice/instant message client, etc. The SFSD service can provide many benefits, including efficient maintenance and management, real-time alarm reports, real-time fault reports and good service experience.

Based on these observations, Recommendation ITU-T Y.4558 describes the requirements and functional architecture of the SFSD service.

History

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* To access the Recommendation, type the URL <http://handle.itu.int/> in the address field of your web browser, followed by the Recommendation's unique ID. For example, <http://handle.itu.int/11.1002/1000/11830-en>.

FOREWORD

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The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

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In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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Recommendation ITU-T Y.4558

Requirements and functional architecture of smart fire smoke detection service

1 Scope

This Recommendation describes the requirements and functional architecture of the smart fire smoke detection (SFSD) service to improve efficiency of maintenance and management, provide real-time alarms and fault reports and enhance service experience.

The scope of this Recommendation includes:

- Introduction to the SFSD service, including the issues of the traditional fire smoke detection service and the benefits of the SFSD service;
- Requirements of the SFSD service for SFSD device capabilities and SFSD platform capabilities;
- Functional architecture of SFSD devices and the SFSD platform within the SFSD service;
- Implementation and deployment model.

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.

None.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 application [b-ITU-T Y.2091]: A structured set of capabilities, which provide value-added functionality supported by one or more services, which may be supported by an API interface.

3.1.2 capability [b-ITU-R M.1224-1]: The ability of an item to meet a service demand of given quantitative characteristics under given internal conditions.

3.1.3 device [b-ITU-T Y.4000]: With regard to the Internet of things, this is a piece of equipment with the mandatory capabilities of communication and the optional capabilities of sensing, actuation, data capture, data storage and data processing.

3.1.4 functional entity [b-ITU-T Y.2012]: An entity that comprises an indivisible set of specific functions. Functional entities are logical concepts, while groupings of functional entities are used to describe practical, physical implementations.

3.1.5 internet of things [b-ITU-T Y.4000]: A global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on, existing and evolving, interoperable information and communication technologies.

3.1.6 service [b-ITU-T Y.2091]: A set of functions and facilities offered to a user by a provider.

3.1.7 smoke alarm [b-ISO 12239]: Device containing within one housing all the components, except possibly the power source, necessary for detecting smoke and generating an alarm condition.

3.2 Terms defined in this Recommendation

None.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

APP	Application
FE	Functional Entity
GIS	Geographic Information System
IoT	Internet of Things
NB-IoT	Narrow Band-Internet of Things
SFSD	Smart Fire Smoke Detection
SMS	Short Message Service
TTS	Text to Speech
UI	User Interface

5 Conventions

In this Recommendation:

The keywords "**is required to**" indicate a requirement which must be strictly followed and from which no deviation is permitted if conformance to this document is to be claimed.

The keywords "**is recommended**" indicate a requirement which is recommended but which is not absolutely required. Thus, this requirement need not be present to claim conformance.

The keywords "**can optionally**" and "**may**" indicate an optional requirement which is permissible, without implying any sense of being recommended. These terms are not intended to imply that the vendor's implementation must provide the option and the feature can be optionally enabled by the network operator/service provider. Rather, it means the vendor may optionally provide the feature and still claim conformance with the specification.

6 Introduction to the smart fire smoke detection service

The fire smoke detection service usually detects the smoke concentration through sensors and sends a fire alarm to prevent fire when the smoke concentration reaches a certain threshold. It is usually deployed in an indoor environment such as residential buildings, factories, shopping malls, hotels, office buildings, teaching buildings, banks, libraries, warehouses, etc.

With the development of society and economy, the fire smoke detection service is playing a more and more important role in people's life. However, some issues exist in the traditional fire smoke detection service as describes below:

- Inefficient maintenance and management:
It is difficult to realize automatic inspection in the traditional fire smoke detection service. Thus, inspection can be done regularly by professional maintenance personnel. Therefore, on the one hand, this involves high labour costs. On the other hand, device failure cannot be