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SERIES Y: GLOBAL INFORMATION
INFRASTRUCTURE, INTERNET PROTOCOL ASPECTS,
NEXT-GENERATION NETWORKS, INTERNET OF
THINGS AND SMART CITIES

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

Service model for a cultivation plan service at the pre-production stage

Recommendation ITU-T Y.2244

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Recommendation ITU-T Y.2244

Service model for a cultivation plan service at the pre-production stage

Summary

A cultivation plan service at the pre-production stage is critical in that it supports decision making of agricultural producers by providing relevant information such as predicted crop production or expected profits for consulting or other agricultural information. A service model is required to derive necessary service features that support these aims. Therefore, Recommendation ITU-T Y.2244 describes the service model for a cultivation plan service including reference architecture, service requirements, and related capabilities..

History

Edition	Recommendation	Approval	Study Group	Unique ID*
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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 World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

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.

NOTE

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

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure, e.g., interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

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As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database at <http://www.itu.int/ITU-T/ipr/>.

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Recommendation ITU-T Y.2244

Service model for a cultivation plan service at the pre-production stage

1 Scope

This Recommendation covers, for a cultivation plan service at the pre-production stage, the following:

- service requirements;
- reference architecture;
- service scenarios.

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.2701] ITU-T Recommendation ITU-T Y.2701 (2007), *Security requirements for NGN release 1*.
- [ITU-T Y.4401] ITU-T Recommendation Y.4401/Y.2068 (2015), *Functional framework and capabilities of the Internet of things*.
- [ITU-T Y.4806] ITU-T Recommendation Y.4806 (2017), *Security capabilities supporting safety of the Internet of things*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 agricultural producer [b-ITU-T Y.4450]: The service role that actually produces agricultural products to be supplied to distributors or consumers.

3.1.2 big data [b-ITU-T Y.3600]: A paradigm for enabling the collection, storage, management, analysis and visualization, potentially under real-time constraints, of extensive datasets with heterogeneous characteristics.

NOTE – Examples of datasets characteristics include high-volume, high-velocity, high-variety, etc.

3.1.3 Internet of things (IoT) [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.

3.1.4 machine learning (ML) [b-ITU-T Y.3172]: Processes that enable computational systems to understand data and gain knowledge from it without necessarily being explicitly programmed.

3.1.5 service user [b-ITU-T T.135]: A person, an organization or any intermediate entity using the services provided by a service provider.

3.1.6 smart farming service provider [b-ITU-T Y.4450]: 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.



3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 agricultural information: All information regarding agricultural processes, such as raw data from farm fields, markets, yearly log data and expertise information.

3.2.2 agricultural information repository: An information repository that holds all information including measured data from farm fields and markets, log data, and expertise data, predicted or calculated information relevant to smart farming to support cultivation plan consultation for service users.

3.2.3 big data analysis: Scrutiny performed on massive volume of data with the purpose of obtaining meaningful results, such as trends or preferences.

3.2.4 cultivation plan: A scheme of service users' decisions on every aspects of agricultural production, such as selected crops, seeding time and seeding amount, before cultivation starts.

3.2.5 data accumulation functional entity: A functional entity that collects log data from an environment monitoring function and a knowhow base management function to provide cultivation plan consultation and related information to service users.

3.2.6 data analysis function: A function that analyses collected data by analytical means such as big data analysis or machine learning, and produces meaningful results to help the consultation process.

3.2.7 data collection function: A function that collects measured data, log data, expertise data through functional entities inside itself.

3.2.8 environment monitoring functional entity: A functional entity that collects cultivation data (e.g., temperature, humidity and pH), market status data (stock amount, price of crops and market demand), and production cost data (e.g., water usage, power usage and payroll information) for data analysis to be used for cultivation plan consultation.

3.2.9 expertise data: Values gathered from skilled service users, experts, service user communities that will help cultivation.

3.2.10 knowhow base management functional entity: A functional entity that gathers expertise data from experts, skilled service users or service user communities to provide cultivation plan consultation and related information to service users.

3.2.11 log data: Values tracked from past consultation, past cultivation records, final profits per variety of crop, etc.

3.2.12 measured data: Values recorded from sensors or measurement facilities, or gathered from agricultural product markets or distribution networks, or government agencies or statistic offices including cultivation data, market status data, production cost data.

3.2.13 plan consulting function: A function that interacts with service users, farmers or enterprises to help service users to make decisions by providing relevant information or analysed results to resolve their concerns.

3.2.14 service provider: An organization owning or controlling one or more systems and using them to provide services.

NOTE – Based on [b-ITU-T T.135].

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

5G Fifth Generation