

Recommendation

ITU-T Y.4602 (03/2023)

SERIES Y: Global information infrastructure, Internet protocol aspects, next-generation networks, Internet of Things and smart cities

Internet of things and smart cities and communities –
Services, applications, computation and data processing

Data processing and management framework for Internet of things and smart cities and communities

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Recommendation ITU-T Y.4602

Data processing and management framework for Internet of things and smart cities and communities

Summary

Recommendation ITU-T Y.4602 describes the data processing and management (DPM) framework organized into five dimensions that are data lifecycle dimension, trust dimension, data commercialisation dimension, data ecosystem dimension, and data governance dimension. The DPM framework covers all the applications and services for Internet of things (IoT) and smart cities and communities. It provides a high-level view of the DPM capabilities required at each stage of the data lifecycle considering different inherent aspects of the data such as its source (personal data, legacy data, and public data) and external aspects that are actions needed to be applied to the data following data manipulation, sharing, security and governance requirements.

History

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Data processing and management (DPM), Internet of things, smart cities and communities.

* 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>.

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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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Recommendation ITU-T Y.4602

Data processing and management framework for Internet of things and smart cities and communities

1 Scope

This Recommendation covers the following:

- A high-level data processing and management (DPM) framework in Internet of things (IoT) and smart cities and communities (SC&C) from a capability perspective;
- Identification of related DPM concepts and their relationships;
- Common considerations of DPM in IoT and SC&C.

This Recommendation is intended to be used by:

- Those who are engaged in DPM activities;
- Those who are involved in data related standardization activities;
- DPM policy-makers and regulators;
- DPM information communication technology (ICT) city service users, developers, evaluators and auditors.

2 References

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]: Structured set of capabilities that provide value added functionality supported by one or more services, which may be supported by an API interface.

3.1.2 capabilities [b-ITU-T X.1601]: Quality of being able to perform a given activity.

3.1.3 closed data [b-ITU-T FG-DPM TS D0.1]: Data that requires access control to be divulged.

3.1.4 data [b-IEC 60050-831]: Representation of facts of objective reality in a formalized manner. Example: Data can be signs and symbols, and can be in analogue form, digital form or both.

NOTE – Data can be used for communication, interpretation or processing by human beings or automatic means.

3.1.5 data commercialization [b-ITU-T FG-DPM TS D0.1]: Process of creating commercial value from data.

NOTE – It may encompass various activities, including but not limited to, monetization, valuation, pricing, licensing, distribution, marketing and sales.

3.1.6 data exchange [b-ITU-T FG-DPM TS D0.1]: Accessing, transferring and archiving of data.

3.1.7 data governance [b-ITU-T FG-DPM TS D0.1]: Set of activities aimed to design, implement and monitor a strategic plan for data asset management.

3.1.8 data management [b-ISO/IEC TR 10032]: Activities of defining, creating, storing, maintaining and providing access to data and associated processes in one or more information systems.

3.1.9 data marketplace [b-ITU-T FG-DPM TS D0.1]: Electronic marketplace whose main product is the provisioning of data and/or related services around data.

3.1.10 data processing [b-ISO 5127]: Systematic performance of operations upon data.

3.1.11 data processing and management (DPM) [b-ITU-T FG-DPM TS D0.1]: The combination of all activities either directly performed on or indirectly influencing data.

NOTE 1 – Directly performed activities include among others [collecting/acquiring/capturing], exchanging, storing, securing, manipulating, reusing, aggregating, curating, disposing, monetizing and deleting data.

NOTE 2 – Indirectly influencing activities include among others policy and standards making, skills and innovation enhancement.

3.1.12 data sharing [b-ITU-T FG-DPM TS D0.1]: The process of data exchange among different parties with specified conditions.

3.1.13 ecosystem [b-ITU-T FG-DPM TS D0.1]: A set of organizations forming a distributed system with both technical and non-technical properties.

NOTE – In DPM, ecosystem refers to a data ecosystem, which is comprised of the technical and non-technical factors and mechanisms which directly or indirectly impact DPM activities in an ecosystem, based on various degrees of interoperability. Factors and mechanisms include, but are not limited to, data laws, regulations and policies, data standards, data skills, data research and development programmes, data entrepreneurship, data economy financial incentives and data platforms.

3.1.14 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.

NOTE 1 – Through the exploitation of identification, data capture, processing and communication capabilities, the IoT makes full use of things to offer services to all kinds of applications, whilst ensuring that security and privacy requirements are fulfilled.

NOTE 2 – In a broader perspective, the IoT can be perceived as a vision with technological and societal implications.

3.1.15 interoperability [b-ITU-T Y.101]: The ability of two or more systems or applications to exchange information and to mutually use the information that has been exchanged.

3.1.16 minimal interoperability [b-ITU-T FG-DPM TS D0.1]: The minimal sufficient degree needed to meet a certain requirement for data sharing, use and reuse.

NOTE – This is an approach to build a set of modular mechanisms, including information models, across multiple domains, locations and events. The definition aligns with the definition of "interoperability" in [b-ITU-T Y.101].

3.1.17 lifecycle [b-ISO/IEC TR 29110-5-3]: Evolution of a system, product, service, project, or other human-made entity from conception through retirement.

3.1.18 open data [b-ITU-T FG-DPM TS D0.1]: Any information that has been made available for anyone under a legal framework to access, alter, and share without restrictions.

NOTE – It can be from a public source, e.g., government data, or from a business, e.g., company intelligence, and can be used for both commercial and non-commercial purposes.

3.1.19 personal data [b-PAS 185]: Data which relates to a living individual who can be identified: a) from those data; or b) from those data and other information which is in the possession of, or is likely to come into the possession of, the data controller, and includes any expression of opinion about the individual and any indication of the intentions of the data controller or any other person in respect of the individual.

3.1.20 processed data [b-ISO 5127]: Data that have been transformed from raw data or from an earlier data stage into a more refined stage by data cleaning, sorting, linking, verifying and similar operations.