Question 4/20 – Data analytics, sharing, processing and management, including big data aspects, of IoT and SC&C

(Continuation of Question 4/20)

1 Motivation

There is an increasing demand for connected cities with pervasive embedded devices to improve quality of Internet of Things (IoT) and Smart Cities and Communities (SC&C) services. The evolution of IoT technology with interconnected things conceives a "smart environment" with an autonomous information infrastructure, diverse data sources and more than 50 billion devices within the IoT and SC&C ecosystem.

While traditional information databases and analytics architectures and infrastructures remain essential, with the growing data management demands, specific capabilities and capacities are required to be able to handle diverse and complex data streams from different sources. This data needs to be processed and managed properly to maximize its value in a secure and policy compliant manner, while complementing it with other information sources.

It is important to note that any imperfections within the Data Processing and Management (DPM) framework can adversely affect the quality of services, pose risks associated with security and could hinder the overall urban planning and decision-making process.

In light of the above, IoT and SC&C environments increasingly require defined and comprehensive DPM frameworks and guidelines which incorporate reasonable measures to achieve a layered, data-centric paradigm. Data driven services and applications will be enabled by data analytics incorporated into the data ecosystem using emerging technologies (e.g., blockchain, artificial intelligence, digital twin, etc.) to support IoT and SC&C. Therefore, the Question will identify and study characteristics of emerging DPM systems considering big data aspects of IoT and SC&C.

Implementing feasible DPM guidelines and standards can make the collection, storage and retrieval of large amounts of data fast and cost-effective while addressing data complexities and governance.

Taking into account the data ecosystem that affects various stakeholders, this Question will develop a series of Recommendations on effective DPM, data analytics and sharing for IoT and SC&C.

2 Questions

This Question focuses on DPM, data analytics and sharing including big data aspects for IoT and SC&C.

Study items include, but are not limited to:

– analysis of existing technologies, platforms, guidelines and standards for DPM in support of the mandate of SG20;

– architectural frameworks for the future of data driven ecosystems and their applications with DPM and big data;

– data analytics and data sharing issues with the development of efficient and scalable DPM approaches;

– the role of emerging technologies (e.g., blockchain, artificial intelligence and digital twin, etc.) to support DPM;

– governance, security and privacy concerns within DPM frameworks;

– trusted data and data quality in DPM frameworks including digital identification and certification; and

– collaboration with standards development organizations (SDOs) to maximize synergies and harmonize existing standards related to this field work.

3 Tasks

Tasks include, but are not limited to:

– Developing Recommendations, Supplements, Reports, Guidelines, etc. as appropriate for DPM for IoT and SC&C, covering:

  • methodology for DPM concept building based on use cases, requirements analysis;

  • data value chain, data lifecycle, capabilities and functional architectures to support DPM including big data aspects for IoT and SC&C;

  • data analytics and data sharing to support data-driven intelligent services and applications for IoT and SC&C;

  • tools, mechanisms and standardized interfaces for data analytics and data sharing;

  • DPM, data analytics and sharing with support of emerging technologies (e.g., blockchain, artificial intelligence and digital twin, etc.) in IoT and SC&C;

  • governance, security, privacy protection and risk management for IoT and SC&C;

  • trusted data and data quality management for IoT and SC&C.

– Providing the necessary collaboration for joint activities in this field within ITU and between ITU-T and other relevant SDOs, consortia and forums.

An up-to-date status of work under this Question is contained in the SG20 work programme (https://www.itu.int/ITU-T/workprog/wp_search.aspx?sp=17&q=4/20).

4 Relationships

WSIS Action Lines:

– C2, C3, C5, C6, C7, C8, C10, C11

Sustainable Development Goals:

– 9, 10 and 11

Recommendations:

– Y.4000-series on IoT and smart cities & communities

– Y.4000-series on Data Processing and Management (including ITU-T FG-DPM deliverables)

Questions:

– All ITU-T SG20 Questions

Study Groups:

– ITU-T (e.g., considering their lead study group role), ITU-D and ITU-R Study Groups, as appropriate

– This Question will coordinate with ITU-T SG13 on big data relevant aspects.

Other bodies:

– 3GPP

– 5G Alliances (e.g., 5G AA, 5G ACIA, etc.)

– BDVA

– BSI

– ETSI

– GSMA

– IEEE

- IETF
- ISO/IEC JTC 1
- Joint IEC-ISO-ITU Smart Cities Task Force
- OASC
- OCF
- OMA
- oneM2M
- OSG
- W3C