Question 3/20 – IoT and SC&C architectures, protocols and QoS/QoE

(Continuation of Question 3/20)

1 Motivation

As the Internet of Things (IoT) establishes its position as an underlying mechanism for various applications, special attention is being paid to how advanced information and communication technology (ICT) systems are designed based on IoT and related conceptual architectures including network requirements and protocols. Given the rich features of IoT, highly capable ICT systems meeting vertical industry demands can be realized by supplementary development based on IoT architectures. This is a promising way in terms of efficiency and time to market.

To support this approach, the IoT and SC&C architectures, their functionalities, interfaces, protocols, data models, intelligent management mechanisms, control mechanisms, connectivity technologies, APIs, and Quality of Experience/Service (QoE/QoS) have to be studied, also building on existing Recommendations, including ITU-T Y.4000/Y.2060.

2 Questions

This Question addresses architectures, including their functionalities, interfaces, protocols, data models, intelligent management mechanisms, control mechanisms, connectivity technologies, APIs, and Quality of Experience/Service (QoE/QoS) of IoT and Smart Sustainable Cities and Communities (SSC&C), which needed to construct architectural frameworks to interact with services and applications, as well as different networks and systems.

Study items to be considered include, but are not limited to:

– What new and revised Recommendations are required to realize IoT and SC&C architectures?

– What technologies including networks, interfaces, functions, management mechanisms, as well as protocols are required for the architecture of IoT and SC&C?

– What functionalities of the ICT technologies, signalling and control architectures are required to support services and/or applications of IoT and SC&C?

– What enhancements to existing connectivity, interfaces, functions, management mechanisms and protocols are required to support machine-to-machine (M2M) communication services and/or applications of IoT and SC&C?

– What performance requirements of connectivity technologies are required to support services and/or applications of IoT and SC&C?

– What are the mechanisms for achieving QoS/QoE and measurement principles required for IoT and SC&C?

– Collaboration with which standards development organizations (SDOs) would be necessary to maximize synergies and harmonize existing standards?

3 Tasks

Tasks include, but are not limited to:

– Developing Recommendations, Reports, Guidelines, etc. as appropriate on:

- conducting studies on general reference models on IoT and vertical industry needs

- developing frameworks to identify the basic architectural compositions and views on IoT and SC&C. These will be based on the architectural requirements derived from the industry needs;

- identifying entities, their functions, and reference points required to provide support to IoT applications and services;

- determining the requirements that the connectivity and protocols are intended to support. It is anticipated that these requirements will need to be periodically refined to reflect the evolution of IoT related technologies taking into consideration the connectivity, management mechanisms (including device management) and protocols available from ITU-T and other SDOs;
- developing modifications and enhancements to the signalling requirements, connectivity technologies, management mechanisms (including device management) and protocols that will enable them to meet the requirements and architecture of IoT and SC&C;
- identifying performance requirements of connectivity technologies that will enable them to meet the IoT and SC&C requirements;
- developing mechanisms for achieving QoS and its measurement principles required for IoT and SC&C;
- identifying interfaces for which interoperability between different IoT network elements is desirable and for which detailed requirements need to be studied and protocols need to be standardized;
- defining interworking with legacy systems;
- developing intelligence control related technologies that will provide support to IoT applications and services for various verticals and systems;
- identifying mechanisms for achieving architectural interoperability for IoT and SC&C.
- Providing the necessary collaboration for joint activities in this field within ITU and between ITU and SDOs, consortia and forum.

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=3/20).

4 Relationships

WSIS Action Lines:
- C2, C3, C5, C6, C7, C8, C10

Sustainable Development Goals:
- 9 and 11

Recommendations:
- Y.4000-series

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
- IoT signalling and protocols will be developed in collaboration with ITU-T SG11

Other bodies:
- ATIS
- IETF
- ETSI
- oneM2M

- ISO/IEC JTC 1/ WG10
- Joint IEC-ISO-ITU Smart Cities Task Force
- 3GPP/3GPP2
- IEEE
- W3C
- OCF