

Flexible Edge Computing and IoT Architecture

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Abstract

Internet of Things (IoT) has been attracting great attention lately. As related scientific research and development progress, IoT application to industrial and social domains is spreading. A large-scale IoT system based on cloud computing has been prevailing in system construction and management. Related difficulties have emerged such as an increase of network loads, response delays, and privacy concerns. To resolve these and other expected difficulties, application of the concept of "edge computing (EC)" to an IoT system has been investigated, whereby processing is conducted near data sources or control objects. However, no clear task assignment has been established between a cloud and an edge at present, so that a fixed and ad hoc system configuration is taken depending on the application.

In the first part [1] of this talk, we present a proposal for Flexible Edge Computing (FLEC) architecture that solves problems in the conventional IoT architecture or EC. FLEC Architecture is a flexible and advanced IoT system model characterized by environment adaptation ability and user orientation ability. Furthermore, as an application example of the proposed architecture and platform, we show a healthcare support system for a sports event with many participants.

In the second part [2] of this talk, we present a proposal for a multi-agent based flexible IoT edge computing architecture to balance a global optimization by a cloud and a local optimization by edges, and to optimize the role of the cloud server and the edge servers dynamically. Also, as its application examples, we introduce an energy management system based on the proposed edge computing system architecture to show the effectiveness of our proposal.

References

- [1] T.Suganuma, T.Oide, S.Kitagami, K.Sugawara, **N.Shiratori**, "Multiagent based Flexible Edge Computing Architecture for IoT," Special Issue-Edge Computing for the Internet-of-Things, **IEEE Network Magazine**, January 2018(Accepted on October, 2017).
- [2] Shinji Kitagami, Takuo Suganuma, Tadashi Ogino and **Norio Shiratori**, "Proposal of A Multi-agent Based Flexible IoT Edge Computing Architecture Harmonizing Its Control with Cloud Computing," The Fifth International Symposium on Computing and Networking (CANDAR2017), November, 2017.
