Lightweight Web-based Communication Interface Design For Web of Objects

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Abstract: With recent advance of processors and communication technologies, the accessibility toward World-wide-web (WWW) gets better. Recently, there are many tries to integrate devices and things to the Internet. The notions such as Internet of Things (IoT) and Web of Objects (WoO) are the examples. The purpose of Web of Objects is to enhance user’s life and experiences by providing rich web service with sensors and actuators. The difference from legacy device-connected service is that it follows the web’s virtue – loose coupling of service components. The loose coupling is important for the dynamic changes of service such that new device component is added on the service or legacy device gets apart from the service. The device-connected services like fire alarm service, finding missing child service, are composed of four web components – sensor part that detects circumstance changes, actuator part that do something against the circumstance, controller part that process the data, and the service user client.

For loose coupling of these components based on the web technologies, it requires lightweight service logic and bi-direct communication interfaces for limited devices like sensors. Each component works not only as server to deal with requests on it, but also as clients to send requests to other components. For example, the controller part could request working status and measurement value to the sensor part. In this case, the sensor part works as server, and the controller part works as client. If the sensor detects the urgent changes of the measurement value and need to report to the controller part, then sensor part works as client and the controller part works as server. To support various devices with various capacity and protocols, the interfaces should be configured based on lightweight pure web technologies.

In this paper, the lightweight web-based communication interface will be introduced. We designed, configured and implemented this interface for limited device. It is based on the RESTful APIs to react the dynamic changes of service configuration.