

Poster: Docker-Based Self-Organizing IoT Services Architecture for Smarthome

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1. INTRODUCTION

Internet of Things(IoT) was first coined in 1999 by Kevin Ashton.[1] However with the technologies advancement, it seems that intelligent devices will invisibly be embedded in our life in few years. Enormous amounts of data need to be exchanged every seconds.[2] It calls for a seamless effect and easily interpretable communicating architecture. The research proposal will try to address some challenges and possible path in IoT enabled smarthome. It focuses primarily on two categories. Firstly, devices in IoT field is always distributed. So, there is a distributed IoT services architecture instead of traditional control-center solution. However, those devices are also limited in a certain area (such as a home local network). In order to reduce delay and burden, those distributed devices collect context information through a self-organizing broadcast network, and determine their next action based on that context data. Secondly, using *Docker* (a lightweight hardware-agnostic and platform-agnostic container) to package services. In our smarthome network, IoT services are distributed across different home electronics. *Docker* shields all the differences, so that we can quickly deploy and update module in the smarthome network after purchasing new electronics.

2. IOT SERVICES ARCHITECTURE

In the traditional IoT-enabled smarthome solution, all users' orders from mobile and devices information are measured by the central server. It is a heavy burden for the central server. We release some compute tasks to home electronics (such as television). Over these devices, we deploy related IoT services. And these services are wrapped by *Docker*. *Docker container* shields all differences. So services can be heterogeneous and accessible migration between devices. It is friendly while adding new node and updating the home network. As shown in Figure 1, these services communicate with other services through broadcast, and constitute a self-organizing network, just like *Ad-Hoc* (a wireless self-organizing communication network). And for sensors web,

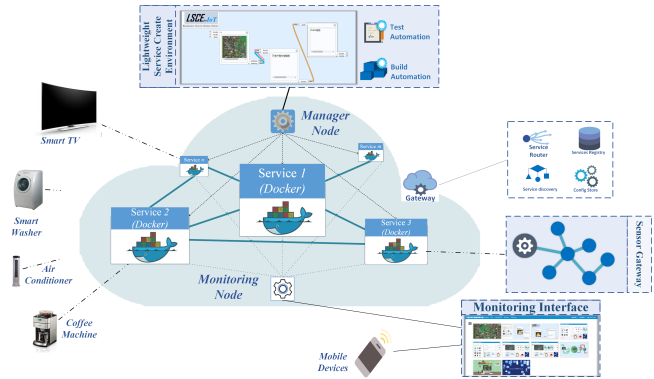


Figure 1: the IoT Services Architecture

they access the network through sensor gateway which is also wrapped by *Docker*. Services collect and process context information through the *Docker* web and then decide the devices' next action.

Over more, we have a drag-drop-way orchestrator called *LSCE4IoT* for service creation. A manager node will analyze created business information and then distribute the choreographer information. Based on the choreographer information and context data, device nodes determine which next node to send data to. Besides manager node, we also insert a monitoring node to catch network's status through broadcast data and return monitoring information to users' screen.

Though this Docker-based self-organizing IoT services network, the smart home devices sense and measure the context information efficiently, and support users' daily lifestyle.

3. ACKNOWLEDGMENTS

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