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Research Article

AN EVENT-DRIVEN SERVICE-ORIENTED ARCHITECTURE FOR THE INTERNET OF THINGS SERVICE EXECUTION

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ABSTRACT

This paper analyses IoT sensing service characteristics and proposes future services architecture. It is focused on middleware architecture and interface presentation technology. In the middleware layer, traditional SOA architecture is insufficient in real-time response and parallel processes of service execution. This paper proposes a new sensing service system based on EDSOA (Event Driven SOA) architecture to support realtime, event-driven, and active service execution. At the presentation layer, this paper presents new IoT browser features, including using augmented reality technology for input and output and realizing the superposition of the physical world and abstract information. Through a use case and proof-of-concept implementation—road manhole cover monitoring system—we verified the feasibility of the proposed ideas and framework.

KEYWORDS

Internet of Things services architecture, sensing service, service collaboration, SOA (Service Oriented Architecture), EDSOA (Event Driven SOA), Internet of Things Browser, Augmented Reality.

INTRODUCTION

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With the rapid development of communication technology, the Internet is gradually evolving from a traditional information publication platform to a distributed computing environment. Cloud computing technology opens up more and more data resources, computing resources and applications as services on Internet. The sustainable development of computer network technology has created a new world full of sensor, RFID (Radio Frequency IDentification), tags for sensing devices in the physical and social environment [1] [2]. The Internet of Things (IoT) goes beyond the original vision of Internet and the World Wide Web. IoT makes the physical world a network and information world. IoT connects and integrates the physical world with the information space. It is an extension of the Internet to the real world, and it brings Internet to an even larger scale. By introducing mass sensors, IoT perceives changes in the real world and provides more intelligent services for people. The IoT service has different features from the traditional Internet service. It can provide environmentally sensitive, real-time, and active service. In this paper, we analyze the characteristics of IoT perception service and put forward the new network service system architecture.

A large number of small IoT applications have been developed already. Sensor networks, CPS (Cyber Physics Systems) and other emerging intelligent services promote the information revolution of a series of applications such as healthcare, environment monitoring, logistics, etc. These new application services are distributed, real-time, dynamic and interactive. They need to deal with information acquired from the physical world and also need to consider the context of the applications themselves. A single perception of the physical world is the foundation of intelligent collaborative services. In the complex service scenarios, we need to collect diverse sensory information to achieve intelligent collaborative service. In particular, IoT service system has the following characteristics different from the traditional information service system [9]: 1) Perceptibility of the environment. Perceptibility is the most basic feature of a perceptual awareness service system. A perceived service system interacts with the environment to support dynamic adaptive computing based on scenarios. The sense device at the end of the sensing service system perceives the environment, including the surrounding temperature, humidity, light, air, monitoring the movement of the animal, etc. The sensory data constantly transfer to the service system, and the service system handles it in real-time to support intelligent calculations based on the situation. For example, according to the user's current location, a mobile phone shows the local weather conditions, real estate prices, and maps information to users. The traditional information service system generally is not contextual. It generally returns response information according to the user's input keyword query information. 2) The service execution is driven by events. The business events are defined by users. For examples, "If a room temperature rises by 10 degrees in 1 minute, there may be a fire. The system should alarm." "If farmland humidity is lower than the threshold, a drought may occur. The system should alarm." etc. The sensing service systems collect and analyze the real-time sense data, get the business events, and then do real-time processing and response to events. As a result, perceived service has the characteristics as the event-driven service execution.

Service has the characteristics of collaborative work. With the expansion of the sensing service application scope, perceived service may need multiple application systems to work together. For example, the early warning service system for forest fire should be coordinated with security, fire control, and medical departments to work together. To handle the large

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emergency events, more departments have to work together. Perceived service system commands many components actively. These components include sensors, computation engine, database, responders, actuators, etc. In the future, the programming model will be the agent cooperation pattern, and it is no longer a sequential process. 4) The sensing service has a long lifetime. By configuring operations perceive service system is running in the long period, instead of the traditional service execution by service calls. In the traditional Internet, we enter keywords and Web search engine returns the search results. In the sense service system, the service request is like "if the event occurred matching the keyword, please inform the system". The service request will remain in effect until the system deletes it initiatively. 5) The sensing service is predictive and proactive. The sensing service system predicts business events and actives service in advance according to the sensory data and context scenarios. For example, the early warning of important event is predicted by the sensing service system. The intelligent active sensing service breaks the traditional passive service mode. It can use all kinds of network resources and actively carry out comprehensive services to meet the individualized service for users.

Future network service system technology development trends The development of future network will deeply change the scale and the behavior of distributed systems. It will bring technological changes to the network transmission protocol, service system architecture, application presentation technologies, etc. The development trend of future network service system technology is shown in Figure 1. In the traditional Internet, TCP/IP and HTTP are the core protocols in the Internet network services to support communication and information sharing. SOA (Service Oriented Architecture) architecture is dominant in the middleware layer. In the future network environment, perceived service will play a more important role. Between perception and service, new technical framework will need to link them. Traditional SOA should be introduced in a distributed Event Driven mechanism, namely EDSOA (Event Driven SOA) to build large-scale distributed applications in IoT.

System Architecture

EDSOA is adopted in the architecture of RMCMS as shown in Figure 4. The camera service is defined as taking pictures and videos. The position sensors provide position service. When position sensors detect position changes, such as tilt, mobile, inversion, etc., the sensor position service will generate position changing event. Camera photograph service and video service will receive the event and then take pictures and video services. That means position change event driving photo service and photographic service execution. By working the three services together, the real-time monitoring of the abnormal state of manhole cover is realized. The system alarms when an event happens, and provides photos and videos at that time.

REFERENCES

1. Calton Pu: A world of opportunities: CPS, IOT, and beyond. DEBS 2011: 229-230
2. Li, Songtai and Qiao, Xiuquan and Li, Xiaofeng, Study on the Architecture of Platform for IoT Service Based on EDSOA, 2012 IEEE 12th International Conference on Computer and Information Technology (CIT), Pages 953--959, 2012.
3. J. Antonio García-Macías, Jorge Alvarez-Lozano, Paul Estrada, Edgardo Avilés-López: Browsing IoT with Sentient Visors. IEEE Computer 44(5): 46-52, 2011.
4. Fatna Belqasmi, Jagdeep Singh, Suhib Younis Bani Melhem, Roch H. Glitho: SOAP-Based vs. RESTful

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Web Services: A Case Study for Multimedia Conferencing. IEEE Internet Computing 16(4): 54-63, 2012. http://dx.doi.org/10.1109/MIC.2012.62

5. Shi Ruisheng, Zhang Yang, Chen Junliang, Xie Hui, Tan Yulin, Guo Wenqi, Chai Zhaohang, Publish/Subscribe Network Service Infrastructure Design for EDSOA Service Platform, in Jisuanji Jicheng Zhizao Xitong/Computer Integrated Manufacturing Systems (CIMS), 18(8), August 2012.