Cloud based Centralized smart object controller for smart institutions

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Abstract:

This paper presents the centralized smart object controller for smart institutions. It allows the users to specify and centrally control the internet of things smart objects. Here it supports end user development and able to handle huge amount of date. The control rules for smart objects are defined by using simple language. It also provides user interface graphically illustrate the data received from smart object. In this paper, we focus our attention on the integration of Cloud and IoT , the goal is to be able to transform data to insight and drive productive, cost-effective action from those insights. Cloud computing can enhance the IoT objects with high performance computing capabilities and huge storage resources.

Index terms

Internet of Things, Cloud Computing, End user development, smart objects, smart institutions.

I.INTRODUCTION

The internet of things (IoT) is the network of smart objects such as physical devices, vehicles, home appliances, lights and other a items smart objects can communicate with one another through internet. The IoT paradigm can be applied to multitude of domains such as health care and industrial automation, smart energy monitoring, smart homes, building and home automation.

The term smart institution refers the centralized and semi-automated control of environmental systems such as heat and lights in the institution environment. The objective of smart institution system is to reduce energy consumption and to improve security, safety and economical benefits. Smart objects are embedded with sensors and actuators to exchange their status.

Today, controlling the smart objects in institutions is very difficult. The logic to control the smart object is programmed with highly technical programming languages. End user development allows end users to configure, modify and control software and hardware artifacts. We propose a system that enables EUD for smart institutions. The controller/individual can personalized all aspects of their institutions.

In this paper we introduce centralized smart object controller system that allows the user to design and configure a smart institution system that responds to their needs. Simple control language (SCL) is used for central control of smart objects in a smart institution.

II. BACK GROUND AND RELATED WORK

A. **Abstract view of smart institution architecture**

A typical smart institution is composed of several SOs that communicate with a central application that is cloud.
This application is referred to in various works as the distributed services oriented middleware, controller and home gateway. This kind of application allows the user to visualize the collected sensory information at various levels.

B. **Existing systems:**

Several works presented for monitoring and controlling SOs. Some of these works presented an IoT are
Middleware, home gateway or hub. Some researchers used mobile devices. However Nichols and Myers developed (UIDL) user interface descriptive language to describe the functionality of SOs.

C. **Smart objects (SOs):**

Smart objects can interact with other computerized items or humans. SOs can be employed within institution for energy usage and distribution management, water management, infrastructure and maintenance and lights management. For instance, several works describe general purpose sensor/actuator boards that can be attached to everyday objects. Kameas et al embedded hardware boards in objects to enable interaction between the objects and the user.

D. End user development (EUD):

The EUD paradigm has been adopted for several smart solutions (eg , ICAP, SITE, SPOK, CAMP). SPOK uses a pseudo-natural language to define event condition action rules to configure and control appliances. SITE uses a simple control language to define the rules and functionalities of SOs.

III.THE PROPOSED SYSTEM

A.CSOC overview

CSOC interacts with user and SOs. SOs are created using General purpose Transducer network(GPTN) and configures a smart environment and sends commands to SOs and visualizes the information produced by SOs using the cloud.

In order setup a smart environment the user performance the following;

1). Build SOs using the GPTN and deploy them in the environment
2). Use the Cloud to:
      a) Register the available SOs by supplying their names and ip addresses
      b) Configure the registered SOs by defining rules to control them
      c) Visualize SOs sensor information.

B.THE General Purpose Transducer Network (GPTN)

In this section we describe the GPTN presented in that allows the creation of network enable clusters of transducers that can be attached to various objects to form SOs. Each cluster is associated with a single network address. The clusters are formed through a plug and play mechanism where a variety of transducers can be connected to a main board through wires using a serial communication protocol called I2C(Inter-Integrated Circuit). The network supports commonly used sensors such as temperature, pressure, light, acceleration, and CO.
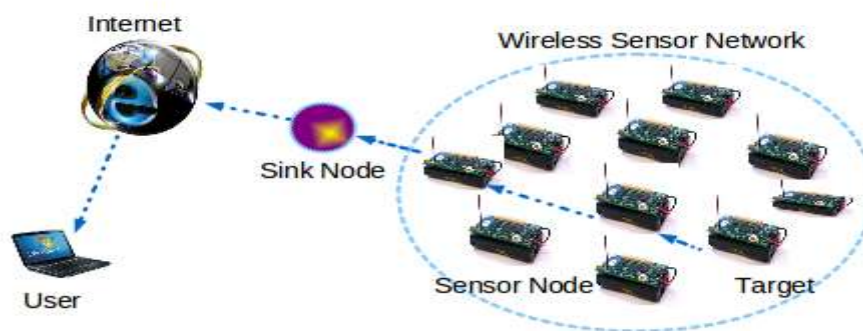

Fig 1.General Purpose Transducer Network

C. Cloud of Things (CoT)

Cloud computing and Internet of Things (IoT) are two very different technologies that are both already part of our life. Their adoption and use are expected to be more and more pervasive, making them important components of the Future Internet. In this paper, we focus our attention on the integration of Cloud and IoT. Since the IoT suffers from limited capabilities in terms of processing power and storage, it must also contend with issues such as performance, security, privacy, reliability. The integration of the IoT into the Cloud is the best way to overcome most of these issues. The Cloud can even benefit from the IoT by expanding its limits with real world objects in a more dynamic and distributed way, and providing new services for billions of devices in different real life scenarios

Cloud computing provides services which make it possible to share computing resources across the Internet. The cloud computing empower an appropriate, on-demand, and scalable network access to a shared pool of configurable computing resources. The cloud-based IoT architecture includes features of cloud-based IoT platform and its interaction with three main cloud computing models: IaaS (infrastructure as a service), Paas (platform as a service), and SaaS (software as a service). The cloud and IoT integration empowers new scenarios, for smart services and applications, as Sensing as a Service (SaaS), Database as a Service (DBaaS), Video Surveillance as a Service (VSaaS), and many more. Cloud Computing provide broader network access through mobile devices, tablets and laptops.

Fig 2. Cloud of Things

IV.CONCLUSION

In this paper, we propose the CSOC system that interacts with users and SOs. CSOS allows the development of smart environment using the GPTN to create SOs CSOC to specify the SO control. Cloud computing helps to achieve a real-time monitoring and controlling of SOs at institution. The IoT and cloud integration involves several challenges and issues as standardization of machine to machine (M2M) communication and interoperability, power and energy efficiency of devices for data transmission and processing, big data generated by several devices, integration methodology, pricing and billing, network communications, storage, etc .Cloud based Centralized smart object controller system helps to control and the smart objects of institute efficiently.

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