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Internet Hardware Mash-up Using Bluetooth

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Abstract:
In the "Internet of Things" vision, the physical world becomes integral with computer networks. Embedded computers or visual markers on everyday objects allow things and information about them to be accessible in the digital world. However, this integration is based on competing standards and requires custom solutions, thus requires extensive time and technical expertise. Based on the success of Web 2.0 mash-up applications, we propose a similar approach for integrating real-world devices to the Web, allowing for them to be easily combined with other virtual and physical resources. In this paper, we discuss the possible integration method, in particular how the REST principles can be applied to embedded devices. Finally, we show how internet interactions can be leveraged to quickly create new prototypes and mash-ups that combine the physical and virtual world.

Keywords: *Web of Things, REST, embedded devices, real-world mash-ups, Web, Internet of Things*

1. Introduction

Interconnecting all our electronic devices we carry around, such as cellular phones, PDAs, and laptops, with wireless links requires a cheap, low-power radio technology that still delivers good performance. To connect objects together at the network layer similar to the way the Internet addressed the lower-level connectivity of computers, the Internet of Things is primarily focusing on web hardware mash-up using Bluetooth technology. Replacing cables used to interconnect internet with devices in order to reduce cost. The mash-up era has emerged in response to the challenge of integrating existing services, data sources, and tools to generate new applications. In this paper, we are going to provide a global overview on web hardware mash-up, using Bluetooth, i.e. we are going to develop a simulation which will allow embedded computers to access the information over internet to the device using PAN (Personal Area Network). In the last decade, a tremendous progress in the field of embedded systems has given birth to a myriad of tiny computers, where virtually any type of sensors/actuators can be attached. By inter-connecting these devices, using low-power wireless communication, a brand new world of possible applications is unveiled. Our main aim is to lay the basis of the future Web of Things. To blend real-world devices into the existing Web, devices and their properties become browse able with any Web browser, with no need to install any additional software or driver.

2. Bluetooth

Bluetooth is a standard wire-replacement communications protocol primarily designed for low-power consumption, with a short range based on low-cost transceiver microchips in each device Because the devices use a radio (broadcast) communications system, they do not have to be in visual line of sight of each other, however a quasi-optical wireless path must be viable. Range is power-class-dependent, but elective ranges vary in practice; see the table on the right.The elective range varies due to propagation conditions, material coverage, production sample variations, antenna configurations and battery conditions. Most Bluetooth applications are in indoor conditions, where attenuation of walls and signal fading due to signal rejections will cause the range to be far lower than the specified line-of-sight ranges of the Bluetooth products. Most Bluetooth applications are battery powered Class 2 devices, with little difference in range whether the other end of the link is a Class 1 or Class 2 device as the lower powered device tends to set the range limit. Bluetooth exists in many products, such as telephones, tablets, media players, robotics systems, handheld, laptops and console gaming equipment, and some high definition headsets, modems, and watches. The technology is useful when transferring information between two or more devices that are near each other in low-bandwidth situations. Bluetooth is commonly used to transfer sound data with telephones (i.e., with a Bluetooth headset) or byte data with handheld computers. Bluetooth protocols simplify the discovery and setup of services between devices.

3. Existing System

Modern industrial production processes require a high level of automation and, currently a considerable part of the total cost is related with cables and cabling maintenance. In a modern factory, there is network stratification: each layer operates at different levels from plant or to administration; thus, for a sensor network, the possibility of connecting with a higher level network is crucial. With the idea of a distributed factory or, generically, of a remote supervision, new technologies related to the Internet, become predominant.

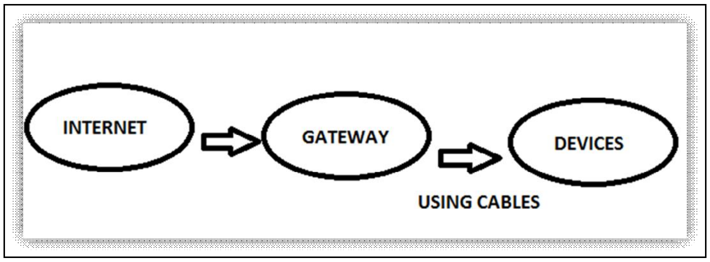

Figure 1: Existing system

4. Proposed System

Our contribution in this project is to integrate real-world things into the existing Web by turning real objects into RESTful resources that can be used directly over HTTP.

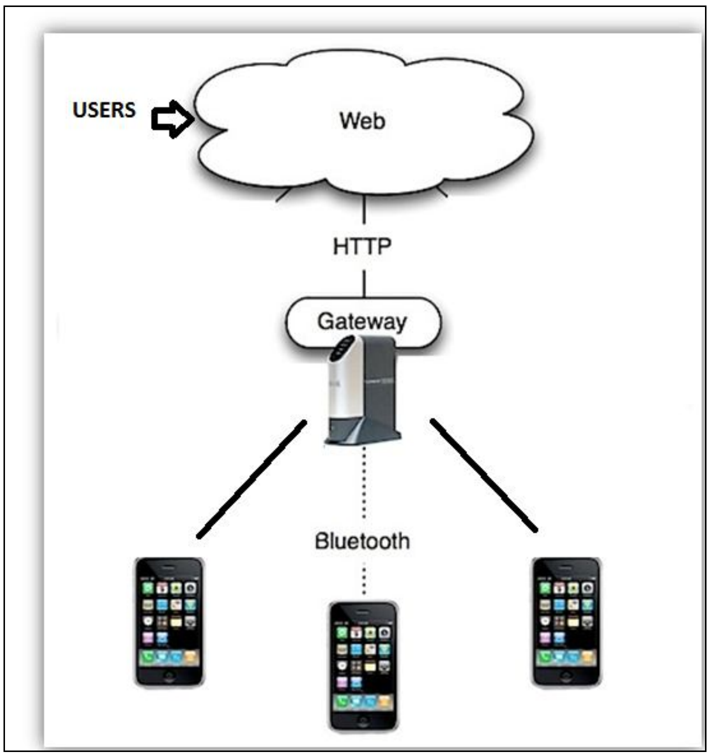

Figure 2: Block diagram.

Our main aim is to lay the basis of the future Web of Things. By providing practical guidelines on how to blend real-world devices into the existing Web, devices and their properties become browse able with any Web browser, with no need to installany additional software or driver. Moreover, simple mash-ups that combine real-time data from physical devices and other Web content can be built with much less effort than required by existing approaches. Gateways to the Internet, supporting transfer control protocol/internet protocol (TCP/IP), enable world connectivity and data sharing. Moreover, if Hypertext transfer protocol (HTTP), i.e., the Web facility,is provided, a further easy and the graphical human machine interface (HMI) can be used.

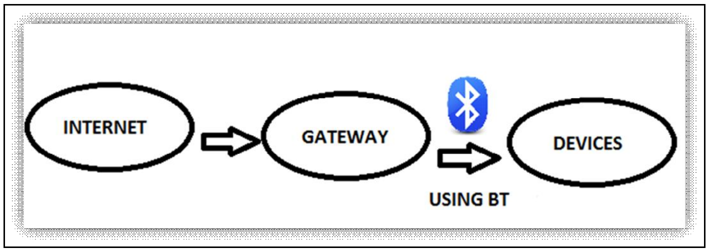

Figure 3: Proposed system

5. Implementations

In order to empirically analyze and test the potential of the RESTful approach for real-world services and how our approach could become the basis for the Web of Things In this section we describe the architecture of both implementations and then focus on how these were used to create mash-ups.The architectural principle that lies at the heart of the Web, namely Representational State Transfer (REST) as designed by Roy Fielding, shares a similar goal with more well-known integration techniques such as WS Web services, which is to increase interoperability for a looser coupling between the parts of distributed applications. However, the goal of REST is to achieve this ina more lightweight and simpler manner, and focuses on resources, the simplicity of REST and its seamless integration into global networks makes it an ideal candidate for creating tactical, ad hoc integration over the Web.

6. Modules

In this project we are having two modules:-

1. File Transfer-File is going to be transferred from a website user to a Bluetooth device via using protocols such as http, OBEX.
2. Device Control-Various devices will be controlled through a website.

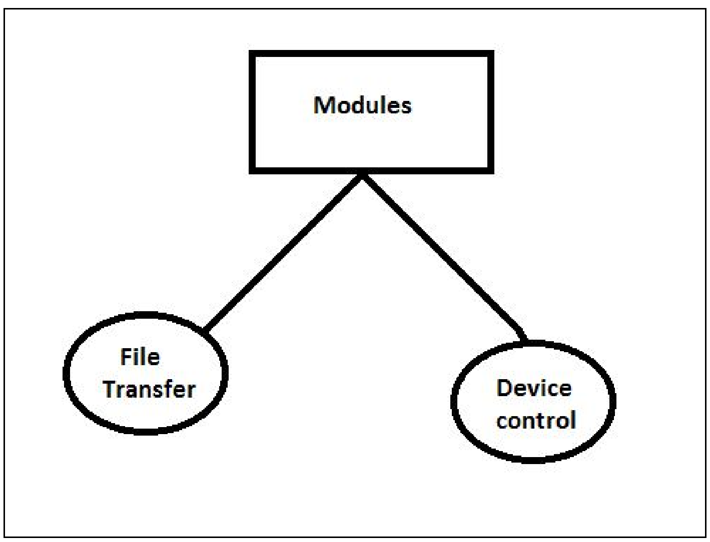

Figure 4: Modules

6.1. File Transfer

File is going to be transferred from an website user to a Bluetooth device via using protocols such as http , OBEX .When a file is going to be transferred from one device to other,every time the user will have to login through website. The idea of each thing having its own Web page is appealing because Web pages could be indexed by search engines, then searched and accessed directly from a Web browser. In the Cool town project, each thing, place, and person have an associated Web page withinformation about them? User login is required for authentication. Ones the user has logged in, the device availability is checked by Gateway. If the desired device is present the file transfer is made through internet. The Internet is a stunning example of a global network of computers that inter-operate smoothly together inspite of the large amount of different software and hardware platforms available, and there is a growing number of embedded devices that can connect directly to the Internet. First,we describe how an actual Web server can be implemented on tiny embedded devices to turn them into RESTful resources. Second, when computational resources are too limited or devices do not over a RESTful interface; we propose to use an intermediate gateway that can offer a unified REST API to access these devices, by hiding the actual communication. As an example, consider a request to a sensor node coming from the Web through the RESTful.
The HTTP request is made for File Transfer. File is transferred using FTP/HTTP. After the request is accepted, the device, Bluetooth is enabled. Finally, by using OBEXprotocol the file is transferred to the desired hardware device.

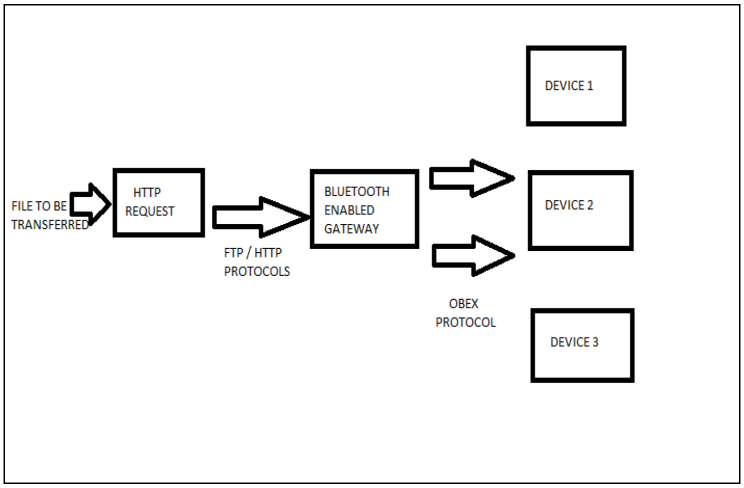

Figure 5: Block diagram

6.2. Device Control

Various devices will be controlled through a website. Various Bluetooth enabled devices can be controlled using this technique. A Smart Gateway can support several types of devices through driver architecture as shown in Figure, where the gateway supports three types of devices and their corresponding communication protocols. Aside from connecting limited devices to the Web, a Smart Gateway can also add more functionality to devices. Gateways can be used for orchestrating the composition of several low-level services into higher-level services available from the REST-full API, that is the creation of mash-ups using device-level services. For instance, if an embedded device offers monitoring of the energy consumption of appliances, the Smart Gateway could provide a service that returns the sum of all the energy consumption monitored by all the embedded devices connected to the gateway. As a result, the gateway calls all the Bluetooth devices and wraps and satisfies the user requirement for device control

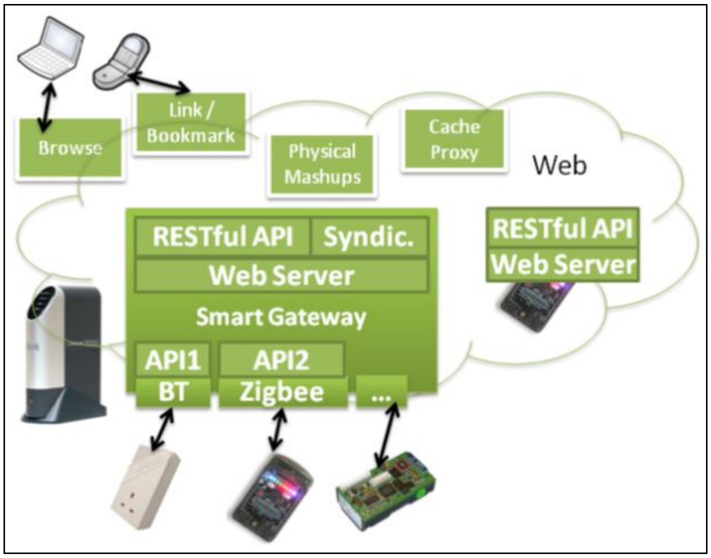

Figure 6: Device control

7. Future Scope

Multiple file transfer from a single client.File transfer can be implemented for various versions of OBEX protocol & also for different other protocols.

8. Conclusion

We develop a simulation for a system for web hardware mash-up using Bluetooth for File transfer & Device control.

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9. Acknowledgment

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