

Online Data Access Control with Bluetooth Beacon for Digital Content Stores

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ARTICLE INFO

Article history:

Received 12 February 2015

Accepted 1 March 2015

Available online 28 March 2015

Keywords:

Insert keywords for your paper

ABSTRACT

Certain Internet services are designed to be accessible to a limited location / an institutions/or a specified area affiliated computer services only, depending on their nature. Thus, in general, based on the IP address to access the service uses the IP-based filtering techniques that limit the delivery of the service. We offer a novel location based authentication method by convenient and correct way to take advantage of the Bluetooth BLE Beacon technology using smart mobile devices or laptop devices. In this research, digital content manager initiates and broadcasts BLE beacon signal for checking the presence of users near a specified area/location. We make use of the BLE Sensor Tag device as the location identification method. In this work, a publisher wants to identify whether a user is from a certain institution subscribed as site license for a period of time or not. Until now, the publisher depends on only IP filtering technique to discriminate users. The IP filtering technique allows the publisher to exclude certain IP ranges from accessing the content. So, the publisher wants to leverage users or readers to pay for accessing a technical paper by credit card. In this research, a "token" which is a pair of some information generated by a Beacon such as UUID and OTP is generated only to a person who is closed to a specified location. If a member has the "token", our system will connect and report to the server that the users/students are attended the class or near the manager. If the member does not have the "token", our system will report to the server that the users/students are not attended the class or not near the manager. By this way a publisher can easily check the readers/users has the right to access the contents.

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To Cite This Article: Young-Woong Ju and Min Choi., Online Data Access Control with Bluetooth Beacon for Digital Content Stores. *Adv. Environ. Biol.*, 9(7), 1-5, 2015

INTRODUCTION

In recent years, various hacking tools development / deployment can be altered their own IP address by temporarily changes to connect to the server. Malicious user/student can manually adjust the information to get an access token for online content providers such as digital libraries or private press companies. Accordingly, the IP address or MAC address-based authentication method which is extensively used for authentication of online database access control nowadays has a problem. Based on the IP address only if the user exists in a particular institution / specific locations to provide online content services, even if called, occurs achieve those objectives, this situation cannot become frequent. Also, visit the IP modulation not even unauthorized users directly to a particular institution / specific location if the IP address of the institution through a wireless LAN, etc. are allocated to your PC / smart terminal, you can access any number on online content there. That is, the authentication of the user who is not a problem with the authentication for the terminal and the IP address that the IP address can be easily modulated also has the problem that it is required.

Recently, an automatic attendance checking by using a RF communication is widely used. However, if the RF card is faulty or students/users not get the RF card, this RF based attendance checking cannot work properly. Moreover, it is not enough to cover the entire areas of a certain lecture room for Near Field Communication and Bluetooth technologies.

To resolve these problems, we offer a novel attendance checking method by convenient and correct way to take advantage of the Wi-Fi 802.11x technology on smart mobile devices. In this research managers initiate AP mode Wi-Fi service for checking attendance of users. Whereas managers have to install a manager version smart application, users can optionally install a client version smart application only if the users are necessary to use

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add-on functionalities. Manager's smart device is connected to the student's smart device at all times. Therefore, the manager can decide whether a student is close to the manager during a specified period of time.

Figure 1 show the necessity of Wi-Fi attendance checking system. When you move a large number of members group by a group of transport (charter bus, etc.) for purposes such as travel, tourism, business trip, you need to stop moving and then start moving again, repetitively. Here we take advantage of this system because we can easily check all members (only if predefined) whether or not the instructors/managers are easily able to check, get in touch quickly by displaying the smartphone leader in instant contact list of members and do not ride the the present invention relates to using a Wi-Fi to be automated attendance management method.

In order to verify that a user is within a defined distance to manager, beacon signal, alive message, or packet are interchanged by communication at regular time intervals (for example, 10 seconds, 60 seconds, etc.) periodically with each other. For the purpose of checking the attendance of the members (students, etc.), students has to connect instructor's smartphone (not necessary only for smartphone, it may be any embedded systems) which is Wi-Fi AP enabled system. In addition, this system supports that unlimited number of devices may be connected. We just make use of Wi-Fi scan to the manager's AP enabled smart devices, rather than be connected to the manager. [6][7]

1. Methodology:

In the present invention, in order to solve this problem BLE (Bluetooth Low Energy) device using the communication, i.e. by using 'Beacon' proposes a location-based authentication method and a system for performing an authentication procedure. In the present invention, such a Beacon to operate with client-server architecture used the platform / device independent REST open API service call to web service techniques. Location-based authentication system that broadcasts to the UUID Beacon BLE (universally unique identity) is an individual user's device receives and validates such as by connecting to the server based on the UUID and OTP (one time password) authentication procedure carried out. If in the present invention, an unspecified number of users to access to the physical device is in a range capable of receiving the broadcast data of the Beacon, the process is very high and all the people using the service by the service scalability (scalability) is the authentication procedure at the same time . Because, Beacon, which on the basis of this study cannot establish a connection required between the transmitter / receiver, because the signal such as one-sided as the Beacon UUID sent it by simply receiving terminal in the user's smart device or laptop computer. In this research, users can make use of web/mobile web on smart devices for viewing digital content through online was applied to BLE Beacon-based authentication system. For an existing method uses the IP or MAC address, to restrict access to view the online content need to use several devices authenticated. But if installation of the Beacon approach is broadcasting a signal only in a given physical location, such as the UUID is allowed as in the present invention, any device that can be received is performed, and this specified engine / position other than the limited access to digital content, the certification process Restrictions may be obtained / code that you can read. That is, even if you do not allow access only from the terminal / PC with a particular IP address or MAC address, in practice it is possible to provide a specific engine / locations must exist a physical confirmation that the user only service physically. Access code is used as OTP (One Time Password) and, depending on the service characteristics can be provided by setting the access code to control the lifetime of service time.

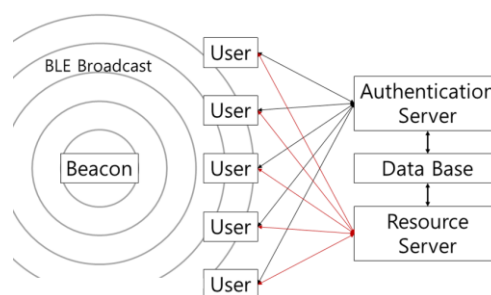


Fig. 1: Authenticatin system architecture using Bluetooth BLE Beacon.

A location-based authentication system of the structure and processing steps of the authentication process using Beacon, and applies the authentication system proposed by the present invention in-line viewing of the digital content service in an illustrative model.

Figure 1 shows the structure and processing steps of the authentication procedure of the location-based authentication system using the Beacon. A location-based authentication system broadcasting signal using the Beacon Beacon (broadcasting) Beacon, user for (user), the client for access to the protected based on the received signal and the authentication code resources Beacon (Client), and, protective the content / service resources have (resource) and the like are issued by the authentication server to the access code to proceed with

the authentication procedures (Authentication Server), the resource server to provide limited service to validate the access code (Resource Server) . Beacon install a physical location to allow service access to the location-based application authentication system in a specific Internet services must operate to broadcasting. This is because the user can perform an authentication procedure to access the Beacon until receiving an authentication code by the individual devices. Even if the user of the device to keep taking unilaterally receiving broadcast data of the user and to perform an authentication procedure Beacon rapid increase does not delay the atmosphere occurs. The user may perform an authentication procedure in order to use a limited service if close to the physical location defined by the service provider and service allows access to the service. The procedure is as follows.

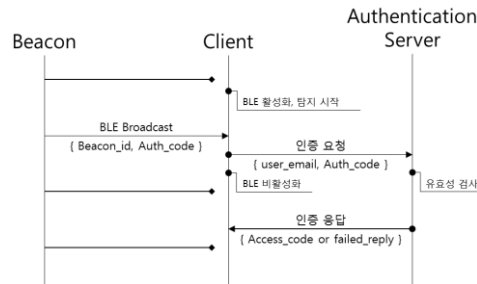


Fig. 2: Authenticatin Flow and Communication between entities.

Figure 2 is a location-based authentication procedure using BLE Beacon. First, the user performs a service access request to the authentication server via a client and transmits the UUID, user_email, OTP and so on as parameters. If the authentication server by validating the consistency of the data received, such as, in the OTP lifetime invalid and returns the authentication unavailable message. If the received information is available by looking at the record and its validity has been issued to that email authentication code performs the validation. If your email has been issued no validity remaining authorization code shall be issued to create a new authorization code

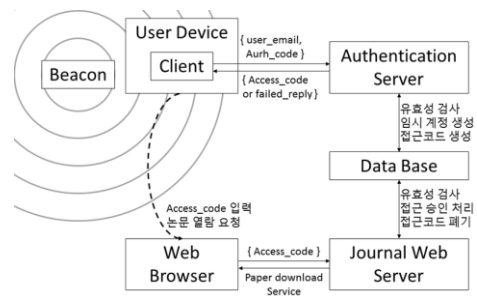


Fig. 3: Location based Athentication Model for digital content access control.

Figure 3 is an exemplary model applying the Beacon authentication system proposed by the present invention in-line paper reading service. The user performs a content delivery request of the resource server via a web browser using the access code issued by the server during authentication (access code). resource server determines whether or not the matching degree of the access code received from the user, such as lifetime service provider to validate a specific engine / Installing the BLE Beacon a particular place, in the present invention, the user can receive the Beacon signal within the field may obtain the right to have physical access to view the content. This method is in high accessibility and user increase to new devices because the authentication process, and depending on whether or not the access procedure without having to physically located in the Beacon-based engine / specific place an existing IP check / filtering method such as were obtained for scalability. The higher the setting, the shorter the issuance of a valid access code received to complete the certification process security of the service can be improved.

The actual implementation of the screen are made of beacons used the Texas Instruments CC2541 sensor-tag developer's kit. The client was implemented in OS-based Android. Resource server is authenticated to the web server has been implemented in the REST Web service API server.

2. Results:

This project not only supports the location based authentication but also supports IP based filtering technique. Figure 6 depicts our log viewer in which the “IP check” colum on the right-most side of the Figure shows the result of IP checking for every access to the web site. There are ‘Y’ in the middle of the IP check

field. This means that the request to 5th content of CAC journal, vol 12, No. 1, published in 2013 was permitted to access by online because the source IP address “143.248.120.11” was resulted in subscriber. In order to resolve this problem, we suggest more confident technique than IP filtering. Authentication based on location is as follows; a “token” which is a pair of some information generated by a Beacon such as UUID and OTP is generated only to a person who is closed to a specified location. If a member has the “token”, our system will connect and report to the server that the users/students are attended the class or near the manager. If the member does not have the “token”, our system will report to the server that the users/students are not attended the class or not near the manager. By this way a publisher can easily check the readers/users has the right to access the contents.

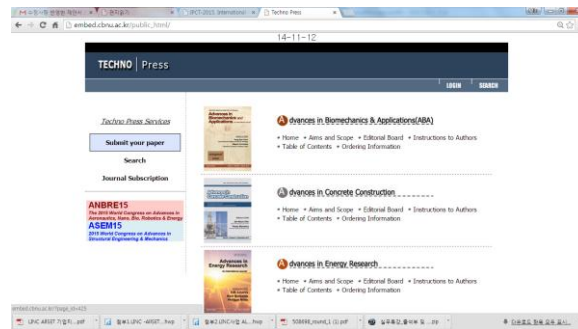


Fig. 4: Top half of the target website for applying project, A publisher’s website.

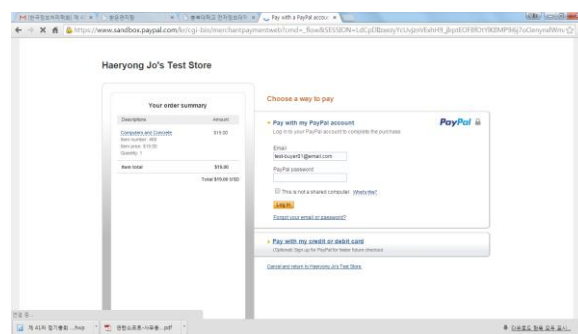


Fig. 5: Paypal credit card payment for payment of an article (payment with the paypal account).

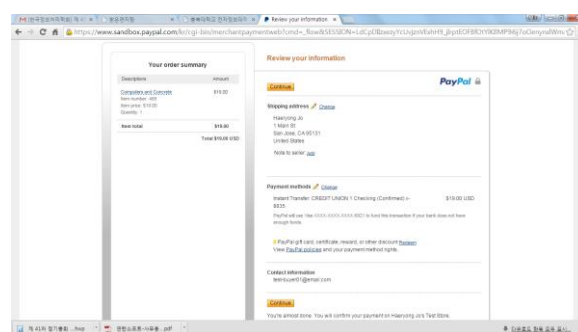


Fig. 6: Paypal credit payment for payment of an article (user information review page).

Figure 5 and Figure 6 is the second page for payment both of an article and a subscription for an year. This page requires users to input the e-mail address. This is because users will have immediate online access to purchased articles for 24 hour period following the completion of the purchase. During the 24 hour period, the users may download and print a copy of each article for personal use and the users can visit our web site and get free access to the purchased article by the given 5-digit access code. The access code will be generated to the users at the time of payment, the code will be send to user by e-mail address above. PayPal makes it easy to accept payments on a website, whether it’s a mobile device, tablet, or PC. We can make use of a short HTML snippet on your website to add a payment button for a single item or for a shopping cart. It is easy for PHP users, but it is not appropriate for the Spring Framework project users. So, we integrate the Paypal payment using

REST interface and OAuth authentication. For this purpose, we first got OAuth keys with those assigned to our own PayPal app. This is the key to authenticate ourselves for accessing our paypal account/store.

3. Conclusion:

In this paper, we offered a novel location based authentication method by convenient and correct way to take advantage of the Bluetooth BLE Beacon technology using smart mobile devices or laptop devices. In this research, digital content manager initiates and broadcasts BLE beacon signal for checking the presence of users near a specified area/location. We make use of the BLE Sensor Tag device as the location identification method. In this work, a publisher wants to identify whether a user is from a certain institution subscribed as site license for a period of time or not. Until now, the publisher depends on only IP filtering technique to discriminate users. IP filtering is simply a mechanism that decides which types of IP datagrams will be processed normally and which will be discarded. The IP filtering technique allows the publisher to exclude certain IP ranges from accessing the content. So, the publisher wants to leverage users or readers to pay for accessing a technical paper by credit card. In this research, a "token" which is a pair of some information generated by a Beacon such as UUID and OTP is generated only to a person who is closed to a specified location. If a member has the "token", our system will connect and report to the server that the users/students are attended the class or near the manager. If the member does not have the "token", our system will report to the server that the users/students are not attended the class or not near the manager. By this way a publisher can easily check the readers/users has the right to access the contents.

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