



Bluetooth Broadcasting

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ABSTRACT

Bluetooth is a wireless communication technology to build small networks of devices. It was designed as a cable replacement technology. Given its widespread adoption, especially in mobile devices, new uses are possible today. For instance, one can broadcast messages to nomadic users based on their location. In this paper, we perform an experimental evaluation of whether Bluetooth is indeed a suitable technology for spontaneous networking and broadcasting. The evaluation does not only consist of a review of current hardware and software, but also of a concrete implementation tested in a controlled indoor and in a not-controlled outdoor environment. The results of the experimentation show that, despite the intrinsic limitation of the original design, Bluetooth is indeed suitable for mobile location-based broadcasting.

Keywords: *Bluetooth, Broadcasting, Devices, Networking, Hardware and Software, Location*

I. INTRODUCTION

Technologies are often used for a different purpose than for what they were originally designed.

A classical example are SMS, which were originally designed as a service for the network operators, but ended up being the most used form of data exchange among mobile phone users.

Another recent example is Yahoo! Pipes designed to be a tool to create mash ups by Webmasters, today is used for more than 95% by ordinary Web surfers.

Bluetooth might have a similar destiny. Bluetooth is a short-range wireless protocol thought for the internetworking of personal devices such as headphones, PDAs, printers and so on. The requirements of the technology include low battery consumption, robustness, and security.

On the other hand, scalability and spontaneous networking were not strongly emphasized in the original design.

Thus, the idea of Bluetooth is to create personal small area networks for users who 'own' all the devices, rather than creating spontaneous large networks of devices that are located in the same location. Today, the wide diffusion of devices equipped with Bluetooth interfaces opens new scenarios where almost every other person in a densely populated area carries a cell phone

What File Types can be broadcasted?

- Through usage of the Baloo blue cast server, we wanted to explore the different file formats that can be used for blue casting and their usefulness in a blue cast service.
- In our tests, we investigated how four different types of mobile devices handled broadcast of various file types.
- The four different types of devices we looked at were mobile phones running Symbian OS (e.g. Nokia and Sony Ericsson), Palm OS PDAs, Windows Mobile PDAs and Windows XP lap-top computers. The file types that are usually supported in commercial bluecasting systems are text files, images, animations, audio, video, Java applications, vCard (business card files) and vCal (calendar event files).
- The tests we performed showed that the limitations of file formats are restricted only by the capabilities of the receiving devices. The tests also showed that the different types of mobile devices handled receiving files in different ways.
- A Symbian OS mobile phone can receive any file type into the inbox, but few files types apart from text, calendar information, pictures, audio and video can be shown on the device.

- If an unsupported file is received, this file can be transferred to a computer that has the software to support the file format. For file types that are supported by the OS, the user can launch the application by opening the file in the inbox directly.

Bluecast Services

Unlike other digital channels for sending information, blue- cast allows for directing broadcasted information towards people in a limited area, rather than a group of known people.

Compared to digital services like SMS, MMS and e-mail, the most noticeable difference is that these services requires known recipients.

Bluecast is thus useful for spreading information for unknown or temporary recipients. The most well know usage of bluecasting is to promote products by broadcasting information, audio or video related to this product. However, bluecasting can be used for other purposes as well. Bluecast contact information:

Bluecasting can be used to broadcast contact information to mobile devices. In this way, the mobile user would receive useful information in very handy way. Such usage of bluecasting is useful e.g. for museums, public offices, shops etc. Bluecast portable information:

In some situations, you would like to have more information about e.g., an attraction, a concert, a shopping centre, and a museum where you are. In such scenarios, the mobile device is used as a portable information carrier, and the bluecast service provides information related to the location you are.

Such information can be public transportation schedules, monument descriptions, shopping centre inventories, etc. Bluecast before an event: In relation to events like concerts, sports arrangements, guest lectures, a bluecast server can be used to broadcast a calendar event that will automatically be placed in you digital calendar on you mobile device.

Such a calendar event usually includes time, date, and can also provide before the event starts and information about the location. Bluecast during an event: Bluecast can also be used to broadcast material related to an on-going event.

Some examples could be to broadcast the slides during a lecture, broadcast a MP3-file during concert, or broadcast contact information during a paper presentation on a conference.

Bluetooth Core System Architecture:

The transceiver operates in the globally unlicensed ISM band at 2.4 GHz. The bit rate is 1 Megabit per second and can be boosted to 2 or 3 Mb/s with Enhanced Data Rate [EDR]. The 79 channels in the band are ordered from channel number 0-78 and are spaced 1 MHz beginning at 2402 GHz. Bluetooth-enabled devices that are communicating share a radio channel and are synchronized to a common clock and frequency hopping pattern. Frequency hopping is used to make the protocol more robust to interference from other devices operating in the same band.

The physical channel is sub-divided into time units known as slots. Data is transmitted between Bluetooth-enabled devices in packets. These packets are situated in the slots. Packets can fill one or more consecutive slots, allowing larger data chunks to be transmitted if the circumstances admit this. Bluetooth is primarily designed for low power consumption and affordability and has a relatively short range (1, 10 or 100 meters). It makes use of low-cost transceiver microchips that are embedded in each device.

CONCLUSION

Since it had to be skipped in this project. Some things that might be interesting to find out with a test group, would be would they use a broadcasting system like this if it was available? Is it convenient enough Would they prefer to have a system where information is sent automatically? One thing that has not been discussed much at all in this project is the security issues with a broadcast. Would it be possible for attackers to send harmful files to people who are expecting a file from a Bluetooth broadcasting station? Is there any ways to prevent attacks like this, or other types of attacks, while still having a working broadcast? The reason this has not been discussed in this project, is that it is quite a large topic, and would probably have made this project too large for the time span given.

Besides, security was hardly an issue before it was found whether Bluetooth as a broadcasting channel had potential or not Now that it is concluded that Bluetooth broadcasting does have potential, however, security issues might need to be researched.

The test broadcasting system that was developed in this project could also be improved upon one thing that was requested by supervisor Alf IngfWang was the option to set the broadcast to automatically send some information to users nearby having Bluetooth devices set to discoverable. This was not included due to time limitations, and is also generally frowned upon by owners of Bluetooth devices. However, it would probably still have some interest for testing purposes.

One other thing that could be interesting, would be to allow the administrator to limit access to some (or a resources to a certain group of people, by registering their Bluetooth IDs, 90or by requiring pass codes or passwords.

A last suggestion would be to make it possible to request more than one file with a command. For example some commands could send a whole image album or a subset of it, allowing users to download more files without needing to send a command for each file they want. With further research and newer versions of the Bluetooth technology.

References

1. T. B. P. Ltd, "Bluecasting", 2009.
2. D. Tsiantar, "Getting on board" in Time Magazine, pp. A1-A4, Apr. 2006.
3. R. Kettimuthu, S. Muthukrishnan, "Is Bluetooth suitable for large scale sensor networks

