

SWARM: Secure Wireless Ad hoc Robots on Mission

CSU647 & CSG258 Spring 2009

School of Computer and Information Science, Northeastern University

Tutorial on Bluetooth Programming

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We offer a sample Bluetooth echo program. The server is implemented with PyBlueZ python extension, which works on both windows and Linux. The Client is implemented with JaveME on windows. In the second part of the tutorial, we summarized a list of Bluetooth development tools we have found so far. You are free to explore any tool that you are comfortable with.

Bluetooth Echo Program

Here is a sample program for Bluetooth communication between PC and mobile devices.

The Bluetooth echo server is implemented with PyBlueZ, a Bluetooth Python extension implemented for both Windows and GNU/Linux. The Bluetooth client is implemented with JaveME, and deployed on Nokia N95 mobile phone.

1. Setup Development Environment

1.1 JaveME

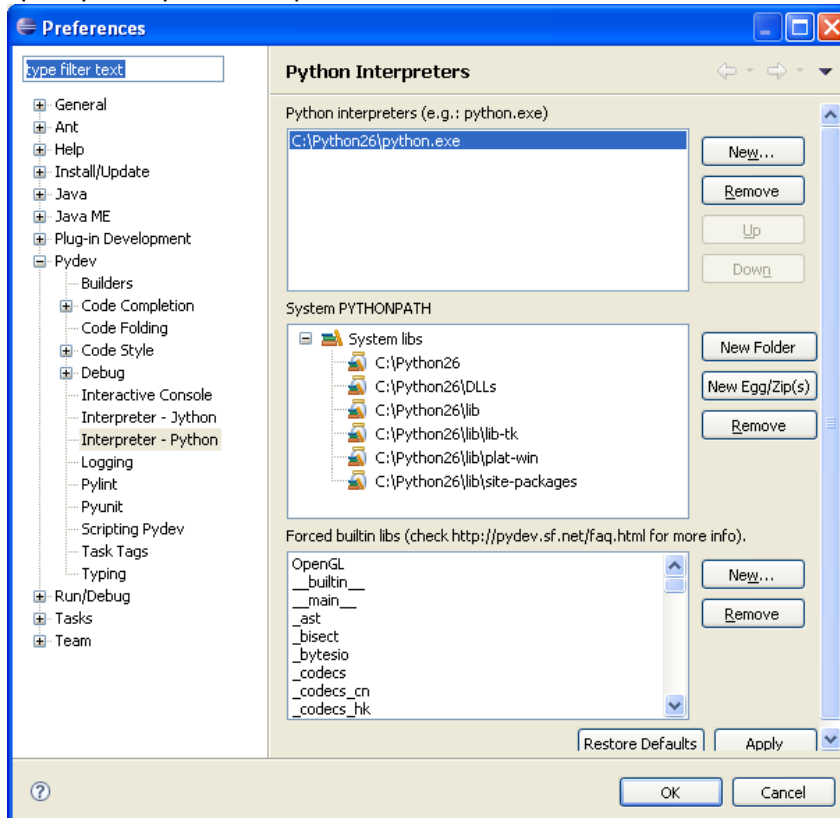
See [Guide To Setup Jave ME Development Environment on Windows](#)

1.2 Python

- Download and install Python 2.6.1 from <http://www.python.org/download/>

If you do NOT use eclipse IDE, skip the following steps and go to 1.3

- Download and Install PyDev Eclipse plugin
<http://pydev.sourceforge.net/download.html>
- Configure Python interpreter path
Open Window->Preferences. Expand Pydev tab.
Click on Interpreter-Python
Specify the Python interpreters



1.3 Install PyBlueZ python extension

- Download and install PyBlueZ from <http://org.csail.mit.edu/pybluez/index.html>

2. Bluetooth Echo Server

- [Here](#) is the sample code for Bluetooth echo server implemented with Python and PyBlueZ extension.
- Download and install UUID generator from <http://www.microsoft.com/downloads/thankyou.aspx?familyId=94551f58-484f-4a8c-bb39-adb270833afc&displayLang=en#>

UUID is a string of format "xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx". In our projet, we use UUID to identify the service running on your Bluetooth server, which should be unique from other services running on neighboring devices.

- Generate a new UUID and replace the uuid value in server code with this new string.

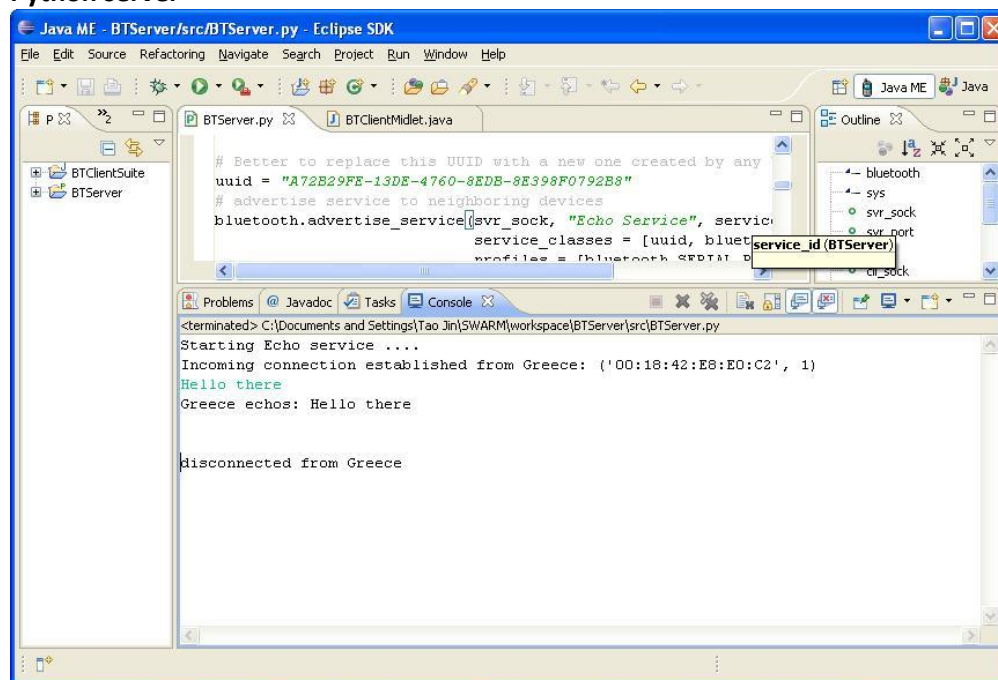
3. Bluetooth Echo Client

- [Here](#) is the sample code for Bluetooth echo client JavaME Midlet application.
- Make sure the uuid value in the java file is the same as the one generated for your server
- Create the jar package and install it on your mobile devices.
- This code is tested on Nokia N95, and should work on all mobile devices running Symbian S60 system.

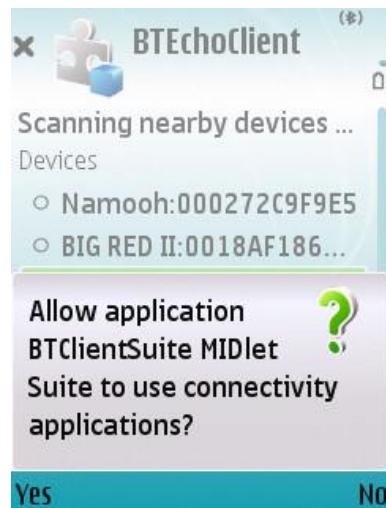
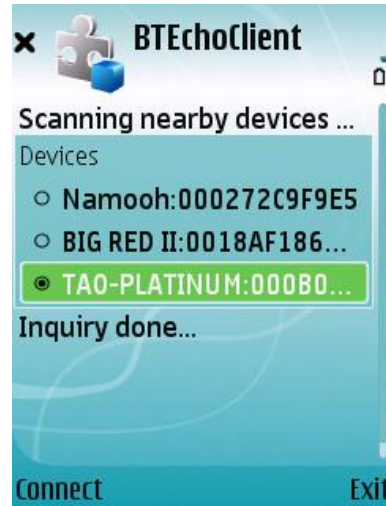
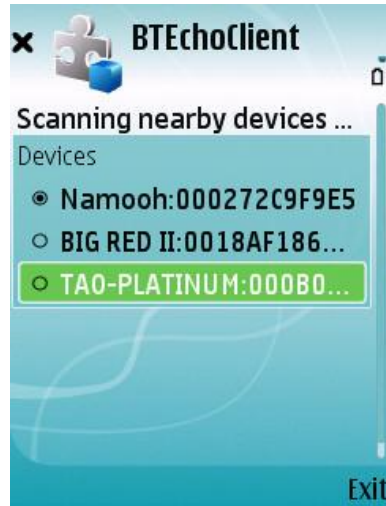
NOTE: If you test with a locked mobile phone, some JavaME API might be disabled by carrier. In this case, when you try to access some local resources, e.g. Bluetooth, contact book, storage, etc. , you might get permission denied error. Contact us if you came across some weird problem.

Screenshots of Echo server and client

- Python server**



- Java ME client



Bluetooth SDK's

You have several options to do Bluetooth programming. Each option has pros and cons.

1.1 BlueZ C-based bluetooth library <http://www.bluez.org/>

BlueZ is the official bluetooth protocol stack on GNU/Linux, and is shipped with almost all popular Linux distributions. If it is not installed by default, you should be able to find package with yum on Fedora or apt-get on Ubuntu/Debian. Please see the bluez web site for detail about installation.

Platform: GNU/Linux

Pros: BlueZ offers a comprehensive support for user to fully exploit the local bluetooth resources.

Cons: There is no good reference document about BlueZ.

1.2 PyBlueZ <http://org.csail.mit.edu/pybluez/>

PyBlueZ is a Python-based bluetooth SDK implemented for Windows(Microsoft Bluetooth stack) and GNU/Linux(BlueZ Bluetooth Stack).

Platform: GNU/Linux, Windows

Pros: cross-platform, easy to pick up, good reference documents

Cons: Probably does NOT offer as fine control as BlueZ offers.

1.3 Java Bluetooth Library

Platform: Windows

Rocosoft <http://www.rocosoft.com>

A pure Java solution implemented for native Windows bluetooth stack.

This is free for non-commercial user.

JavaBluetooth <http://www.javablueetooth.org>

This implementation is for Bluetooth 1.1 and quite limited protocols implemented. Maybe NOT a good choice.

Avetana <http://www.avetana-gmbh.de/avetana-gmbh/produkte/jsr82.eng.xml>

This is NOT free

1.4 Windows Platform SDK

Since WindowsXP SP1, windows started supporting native bluetooth stack, which could be programmed with Windows Platform SDK. You could download winSDK from microsoft web site.

Another alternative stack on windows is Widcomm (http://www.broadcom.com/products/bluetooth_sdk.php). Widcomm supports more transport protocols, so do some research before you choose which one to use.

References:

<http://people.csail.mit.edu/albert/bluez-intro/>