

BLUETOOTH SERIAL PORT ADAPTER PAN PROFILE

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1 Abstract

This document briefly describes the usage of the PAN profile with the connectBlue Serial Port Adapter products.

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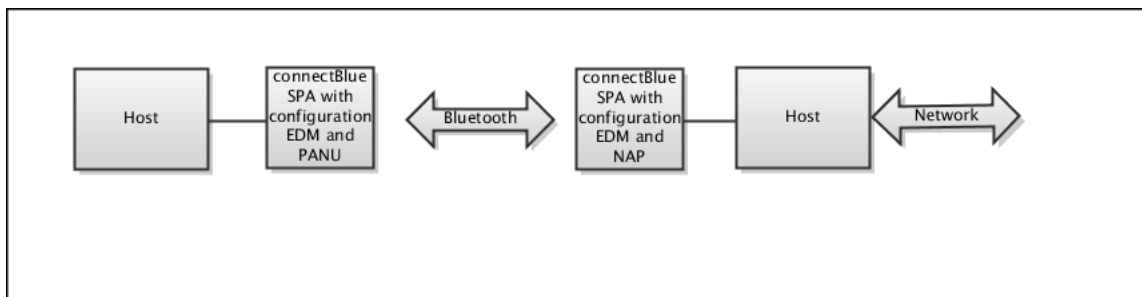
3 Related Documents

1	Serial Port Adapter - Extended Data Mode
2	Bluetooth Serial Port Adapter AT Commands

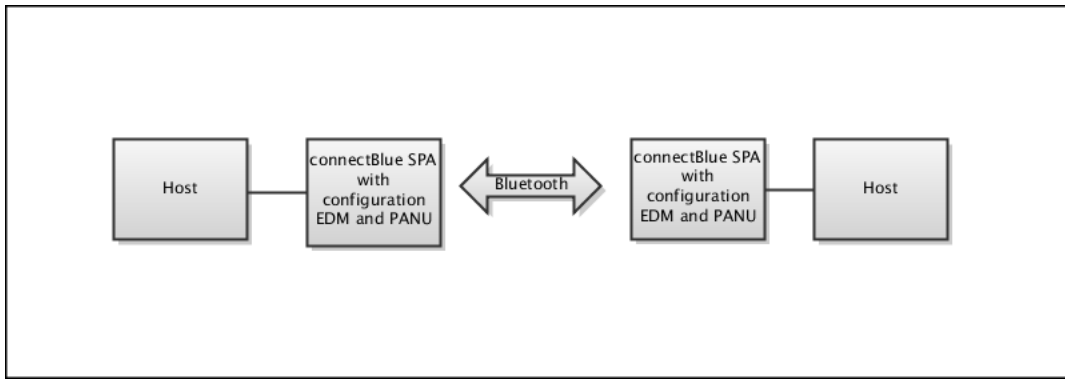
4 Overview

The Personal Area Networking (PAN) Profile specifies how two or more Bluetooth devices can form an ad-hoc network or access a remote network through a network access point. The profile roles, supported by the connectBlue Bluetooth Serial Port Adapter, are Network Access Point (NAP) and Personal Area Network User (PANU).

The network access point (NAP) acts as a bridge between a Bluetooth network and some other network. For example, a Bluetooth PANU enabled device can access the internet through a Bluetooth NAP enabled device.



The personal area network user (PANU) role allows two devices to setup a point-to-point connection for direct communication.



Since the PAN profile transmits ethernet packets and there is no frame delimiters defined by the ethernet standard, it is not possible to use the PAN profile in the normal data mode of the Serial Port Adapter. It would not be possible to know where one frame ended and the next one started. Therefore, the Extended Data Mode (EDM) must be used.

The Extended Data Mode is a simple protocol to enable control of individual Bluetooth connections. Using the Extended Data Mode it is possible to transmit data to one specific remote device and to know from what remote device data is received. Also, the EDM contains frame delimiters which is needed to support the PAN profile. See the *Serial Port Adapter - Extended Data Mode* document for more information about the Extended Data Mode protocol.

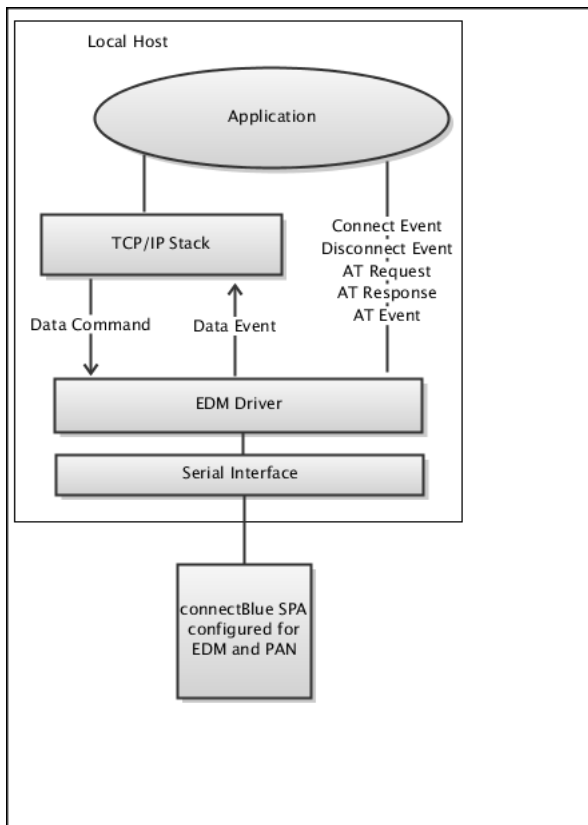
5 PAN Configuration

To configure a connectBlue Bluetooth Serial Port Adapter for PAN the following commands must be considered.

1. Enable *Extended Data Mode*: First enter AT mode and go back to Extended Data Mode using `AT*ADDM=2` instead of `AT*ADDM` or `AT*ADDM=1` (which enters normal Data Mode). Once Extended Data Mode is enabled, the module will always enter EDM on power on.
2. For servers (accepting incoming connections), configure the *PAN-PANU* or *PAN-NAP server profile* using the `AT*ADDSP` command. Use the NAP role if there is another network that can be accessed. Use the PANU role if it is an ad-hoc point-to-point connection.
3. For clients (setting up outgoing connections) there are two options to setup a connection:
 - a. *Configure the PAN-PANU or PAN-NAP client profile and a remote peer*. See `AT*ADDSP`, `AT*ADNRP` and `AT*ADWDRP`.
 - b. Setup the connection in AT mode or by sending an AT command in Extended Data Mode. Use the `AT*ADCP` command to setup a PAN connection. Please note that both the remote and local role must be specified.
4. For a Bluetooth enabled device (e.g. a local host and Bluetooth Serial Port Adapter) to successfully access the network provided by a remote NAP device (e.g. a phone), the local host's MAC address must be the same as the Serial Port Adapter's Bluetooth address. The host's TCP/IP stack can be configured to use either static assigned IP address or DHCP.

6 EDM Driver

To integrate the PAN connection in the TCP/IP stack an EDM driver must be implemented in the local host.



The *Data Command*, to forward ethernet packets from the TCP/IP stack to the SPA, and the *Data Event*, to forward ethernet packets from the SPA to the TCP/IP stack, must always be implemented.

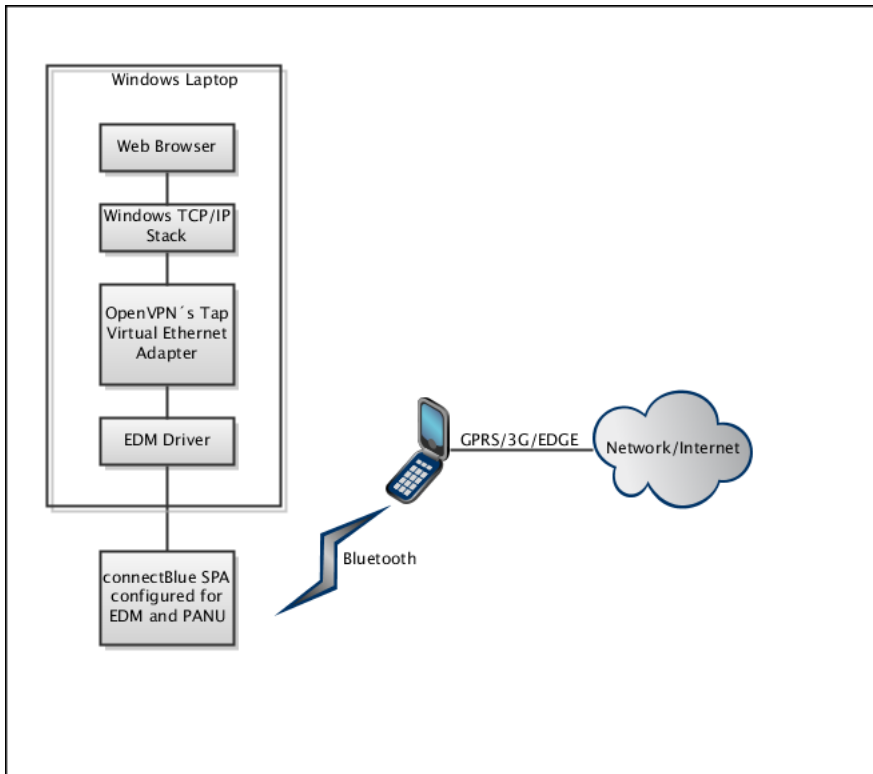
Since it is possible to statically configure the SPA to accept incoming connections or to setup a connection to a remote peer, it can be assumed that the connection is always active. Hence, the *Connect Event* and *Disconnect Event* can be discarded. However, if control of the connection is required, the *Connect Event* and *Disconnect Event* should be parsed as well.

Of course it is also possible to implement support of the *AT Request*, *AT Response* and *AT Event* packets to get full control of the SPA and its functionality.

See *Serial Port Adapter - Extended Data Mode* for details.

7 Sample of Internet Access using a Mobile Phone NAP

For testing, a laptop was Bluetooth enabled using the Bluetooth Serial Port Adapter configured as a PAN-PANU client. OpenVPN (virtual ethernet adapter) was used to install the PAN Serial Port Adapter as an interface to the Windows TCP/IP stack. The OpenVPN is freely available at <http://www.sourceforge.com>.



The implementation of the EDM driver is done as part of the TunTapDemo application which can then be installed as an OpenVPN interface. See http://www.varsanofiev.com/inside/using_tuntap_under_windows.htm to get started.

7.1 Installation Instructions

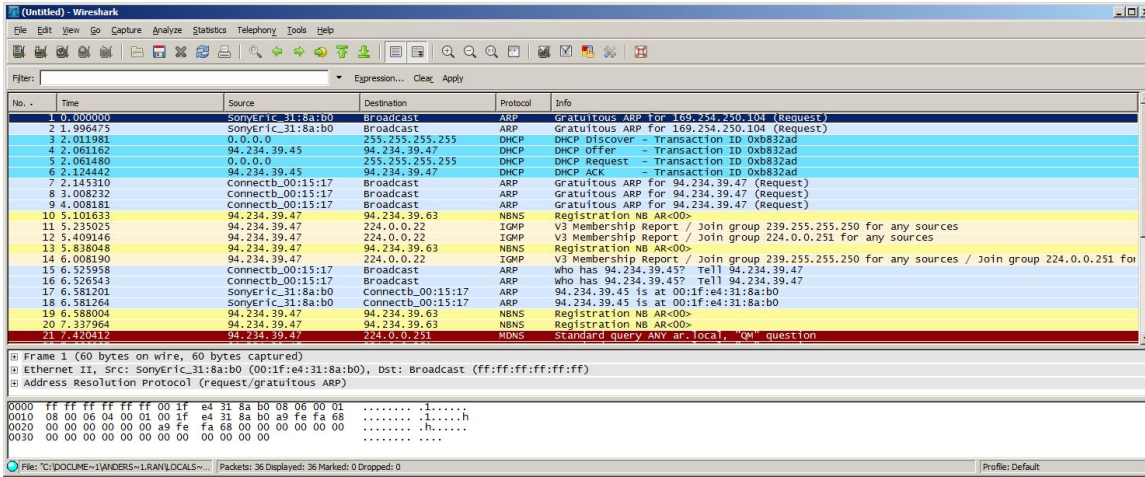
1. Install OpenVPN's Tap Virtual Ethernet Adapter
2. Make sure that .NET 2.0 is installed on the laptop
3. Copy / Install the TunTapDemo application on to the laptop
4. Configure the TunTapDemo application by editing the TunTapDemo.exe.config file
5. Configure the Bluetooth Serial Port Adapter to connect to the PAN-NAP enabled device (in this case the mobile phone) using e.g. the *always connected* scheme of the remote peer command

7.2 Running the Demo

1. Connect the connectBlue Serial Port Adapter to the PAN-NAP mobile phone
2. Start the TunTapDemo application
3. Surf the web

7.3 Wireshark Log and Ipconfig of a successful connection with DHCP

Wireshark



Ipconfig

