1 Extended Abstract

Tendency my works is an example of possible use of mobile device with the program platform .NET Compact Framework to support the management and process visualization. Works includes part theoretical and practical. The theoretical part describes software platforms .NET Compact Framework and the possibilities how could like examples of the deployment of a mobil device PDA with operation system Windows Mobile. The practical part is oriented on creating software components can be used as standard components available in the development environment Microsoft Visual Studio c# 2008 Professional Edition to support the creation of applications for management and monitoring. At the time of writing my works was the current version .NET Compact Framework 3.5.

1.1 .Net Framework

.NET Framework is a program support for the software, its core is based on the principles of object oriented programming. All basic services accessible to other programming languages, automatically supports classes, methods, properties, constructors, event, polymorphism, etc. This means that no matter which programming language creating the program or what components are used. .NET Framework also eliminates problems with security or deployment and application installation. Figure 1 shows the architecture .NET Framework.
1.2 .NET Compact Framework

.NET Compact Framework (next only .NET CF) is a subset of classical .NET Framework for desktop PCs with operation system Microsoft Windows. It is intended primary for small mobile devices such as PDA, PDA communicator or smartphone. Which are devices with limited resources as the computing power, memory and peripherals. .NET CF fully supports about 30 percent of the namespace and classes .NET Framework and only in 8 percent of its size. To preserve such small size .NET CF supports only the most important classes and members.

Differences between .NET CF and .NET Framework is in the following areas:


A more detailed description of the differences is described with other links to the online Microsoft MSDN library at: http://msdn.microsoft.com/en-us/library/2weec7k5.aspx
For reasons of hardware equipment mobile devices .NET CF includes also its unique class in that .NET Framework is not included.

These are for example namespaces:


Operating system with platform .NET CF can be ported to devices such as smartphones, which have even greater limitations in resources and the resolution and screen size, so for these devices is still limited in application components.

The standard components .NET CF, which for these devices are not include:

Button, ContextMenu, DocumentList, DomainUpDown, HardwareButton, Help, InputPanel, LinkLabel, Notification, OpenFileDialog, RadioButton, SaveFileDialog, Splitter, StatusBar, TabControl, TabPage, ToolBar, TrackBar

Significant innovations .NET CF version 3.5 is the programming model of WCF (Windows Communication Foundation) and the integrated query language LINQ. Other new features include changes in the controls TabPage, Panel, Splitter, PictureBox, ComboBox.

News .NET CF version 3.5 are also in such areas as:

SoundPlayer, Compression, Delegates, .NET CF CLR Profiler, Configuration Tool, Debugging, Logging, Platform ID, Runtime Tools, Strong Names, Global Assembly Cache, Documentation, Samples.

Platform .NET CF allows to create applications using the database. Microsoft SQL Server Compact is database on the storage medium of mobile devices in the one file. Or which is the purpose of monitoring and control more usable, for example allows Wi-fi interface connection to a database server such as Microsoft SQL Server. Although contains several restrictions against access to databases in .NET Framework, if we use basic SQL queries for viewing, adding and
1.3 Mobile devices communication with the outside world

Mobile devices communication with the outside world can be divided into two types and it links with interconnecting cables and wireless connections.

Interface for connection with connecting cables is largely today only a USB interface. In older models still run into the RS232 serial port. USB interface in terms of topology is distributed to devices such as USB Host (Control device) and slave device USB Device. If you have a mobile device equipped with USB interface type USB Host, can connect to USB <> RS232 converters, but only those which have drivers for the operating system Windows CE, such as FTDI converters (www.ftdichip.com). And so we can use the newer mobile devices to connect to switches equipped only with RS232 serial port. Connection scheme is shown in Figure 2.

![Connection scheme with connection cable](image)

Figure 2 – Connection scheme with connection cable

The second type mobile devices communication is wireless communication. There is a possibility of slightly more than in connection with connecting cables. Today we have communications with the outside world via Wi-Fi, Bluetooth, GPRS and older mobile devices via infrared trasmission IrDA. Example of wireless mobile interface is schown in Figure 3, where Wi-Fi interface to to connect to corporate networks and communication with the database server with a database such as Microsoft SQL Server.
1.4 *Create your own program components*

When create applications under Windows, which allows intervention by humans or are visually presenting data, mostly to use the program components such as buttons, fields for entering text, checkboxes, etc... For creating applications for mobile devices, we have a development environment from Microsoft Visual Studio. From Visual Studio 2003 .NET is it an integrated part of development programs on mobile devices (only in Professional edition). This development environment also allows creating custom components based on component class UserControl.

That I use in my work and using Microsoft Visual Studio 2008 Professional Edition, created a couple of visualization and control components, summary of components shown in Figure 4.
Components are divided into two types namely:

- **Indicators**
  - Led indicator
  - Led display
  - Square and round meter
  - Status indicator
  - Status indicator with a picture of tanks

- **Controls**
  - ON/OFF button
  - ON/OFF switch
  - Button four directional arrows
  - Emergency button

Figure 4 – Created components

These components are available in the DLL libraries for connecting to the project, it can be used as a standard component of the Visual Studio ToolBox palette. Components are created in .NET CF version 3.5.
In the end are two examples of the use of mobile devices in practice. The first example demonstrates how to use Wi-Fi retrieve data from the MTA Service Management software. The second application (Figure 5) is an application for review of security sensors. There is Wi-Fi interface uses to connect to an Ethernet network and database server where SQL queries using to read state of security sensors.

Figure 5 – Appearance of the application for revision of security sensors