GUI to Web Transcoding

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Abstract - **In this paper a transcoding (transformation) scheme of a graphical application working on a server or desktop computer to web environment will be presented. The main working environments and interfaces are listed as well the main graphical environments. A realization scheme is depicted. The main disadvantages of the current approaches are listed, while the advantages of the new approach are shown.**

Keywords - **transcoding, environments, interfaces, graphical user interface, web interface**

I. INTRODUCTION

So far the following approaches for application transformation are used:

- Web remote administration (Remote Desktop, VNC)
- ActiveX controls for IE connecting with remote Office Express Components
- FireFox add-ons: AutoCAD, SolidWorks, etc.
- Flash animations – they act like ActiveX or add-ons

The major minus of the listed methods is the lack of unification. Also the software looks differently on the different systems.

The control is done by JavaScript and Visual Basic scripts – the development is hard, expensive and insecure. A disadvantage is that the different components do not work the same way each time and there is no portability.

In the web administration the control over the system is taken by the new remote user leaving the current user without control.

II. TYPES OF ENVIRONMENTS FOR USER INTERFACE

In more details the environments for user interface and an algorithm for detection are examined in [1]. They are:

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Shell environment, Web environment, SOAP query, XML-RPC query, REST query, Pure web query GET or POST, WAP, Graphical environment (GTK), Different mobile devices (PDA, Smart phone)

Of course the list is subject to changes and always more environments can be added like environment for sound control based on VoiceXML which is developed, standardized, documented and supported by W3C[3].

III. TRANSCODING - DEFINITION

The transcoding [2] is found in many areas of content adaptation, but here it will be presented in the area of adaptation of contents generated by computer systems and adopted for PDA or SmartPhone devices.

In the area of mobile devices the data transcoding is obligatory because of the multicolor in order to assure good display.

An example is taking a picture with high resolution and sending it to other phone which displays low resolutions. A transcoding of the image is needed to lower the resolution in order to be displayed properly on the remote device. Except that the image depiction is made better sometimes it is obligatory in order to display the image at all.

The transcoding is reduced to data transformation for one system in a format appropriate for another one.

Besides data transformation it is examined a transformation of computing power of the remote terminal. While showing the result the terminal is taking advantage of the computing power of the computer on which the application was started. In this way the computing power of the remote terminal is increased. One more functionality which it adds is the extension of the functionality of the desktop applications to network applications. In this way even the simple one user applications without networking can be transformed into networked without problems only with the help of a web server.

IV. TYPES OF COMPUTER GRAPHICAL INTERFACES

- Windows – this operating system is fully graphical and it gives up the users a very good developed interface which on its own allows to be developed a great deal of applications like video games, CAD systems, systems for 3 dimensional modeling, text processing, imaging and video.
- Unix/Linux/BSD – these are text based operating systems which have graphical server called X server, allowing the creation of sterling software applications. Of course here exists a full scale of

applications for all purposes.

– Mac OS – this is the first graphical operating system. And as such it accounts for one of the best developed graphical user interfaces. The latest versions are UNIX based and as such they have integrated X server.

V. TYPES OF WEB SERVERS

– IIS – Internet Information Server was developed by Microsoft. Its beginning is placed like a part of the late versions of the Windows NT operating system with major functionality for its time. In the following Windows products the next versions appear allowing the creation of dynamic pages using ASP, and later on .NET applications.

– Apache – this is a web server developed by Apache Software Foundation and it is fully open source. The first public version was published in 1995. Currently pressing is second generation server with modular structure and good developed possibility for configuration. The servers allows the execution of all kinds of applications including .NET through Common Gateway Interface or through a handler loaded in the server.

VI. TRANSCODING SCHEME

A transcoding scheme is depicted on Fig. 1. On a given desktop computer or server are started in progress web server, transcoder and a given graphical application (for i.e. Windows, Apache, MathLab). Remote web browser executes POST or GET query to the web server using the http protocol sending data from the mouse and the keyboard. The web server receives the query and executes the transcoder passing him the events.
The transcoder through API communicates with the graphical application passing it the events. Next the transcoder generates image which is the current state of the application and returns the result through the web server to the web browser.
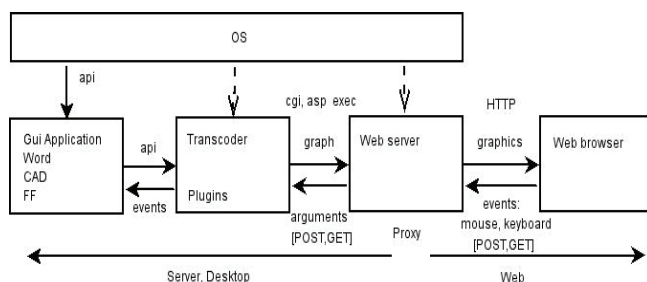

Fig. 1. A transcoding scheme of graphical application from the hosting operating system to web page on the Internet.

On Fig. 2 a modification of the scheme from Fig. 1 is depicted. Here the transcoder and the web server are located on different hosts communicating with each other through

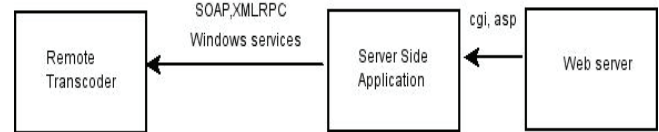helping server application and web services like SOAP, XML RPC or Windows services.

Fig. 2. A modification of the transcoding scheme allowing the execution of graphical applications hosted remotely from the server.

The privilege is that there can be executed applications from many hosts in one local area network only with one web server. This modification is appropriate for the development of administration software.
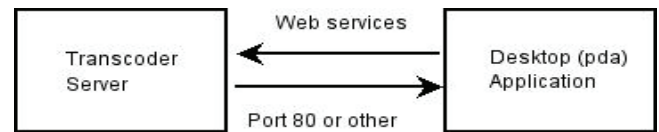

Fig. 3. A modification of the transcoder eliminating the need of web server

On Fig. 3 is depicted a modification of the scheme eliminating the web server while the transcoder is listening directly on port 80 or some other port. In this way remote or desktop PDA applications directly communicate with the graphical applications. This way the transcoding is speeded up and made easier.

VII .NET REALIZATION

On Fig. 4 is depicted a .NET realization. Windows services are used to realize the processes of data exchange.

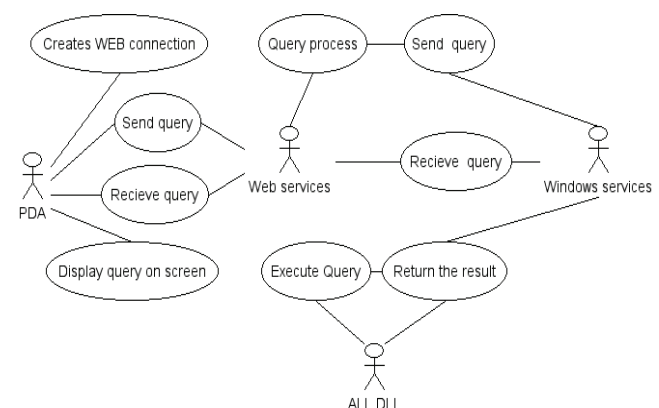On Fig. 5 is depicted a realization with included gzip compression.

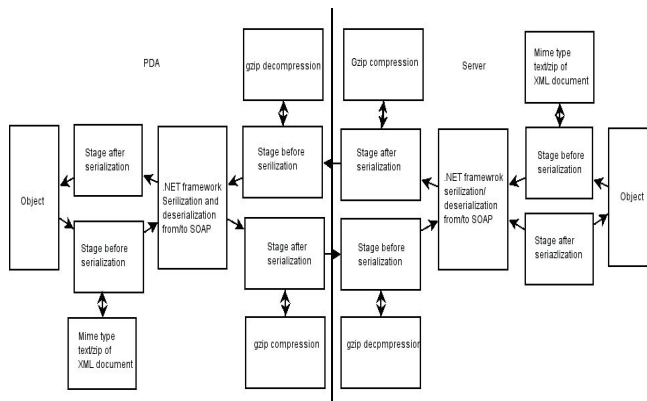Fig. 4. UML diagram of .NET realization

Fig. 5. Scheme with gzip compression

VIII. CONCLUSIONS

The major disadvantages of the current methods for transcoding were shown and a unified and universal method was described. The development can be transformed into middleware for transcoding. In the current realization the graphical interface started on a desktop computer works in background regime and does not interfere with the current user using the resources. One big area of application of the method is remote and mobile training.

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