A High Level User Interface for the Graphics for WWW

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An approach for application of the HIGZ programs within the WWW-server is suggested. It is based on the HIGW3 (**H**igh level user **I**nterface to the **G**raphics for **W3**) package developed for realizing a set of HIGZ functions in the WWW environment.

Key words: WWW; Java; HIGZ.

Introduction

The WWW ("Wold Wide Web") project was started by Tim Berners-Lee at CERN – the European Laboratory for Particle Physics. It was developed in order to provide for information sharing between the huge number of dispersed international collaborations applying the Internet. Very soon the WWW spread over other areas, and presently it is the most advanced information system in the world.

The WWW system is based on WWW-servers interconnected within the Internet. Each WWW-server consists of various hypertext documents, which may contain pointer-links to other Web servers and documents. Till the appearance of the Java language, the Web played the passive role of a hypertext exchanger. The possibility to develop, load and run programs within the Internet solved the issue of the WWW system passivity.

Recently, various program codes in C, C++ and Fortran have been transformed by Web users into Java code. Among such programs there were codes developed with the help of the HIGZ [1] (High Level Interface to Graphics and Zebra) package which offers a high high level user interface to the standard graphics packages (like GKS or X-Window), keeping the program independent of it. In each case, such transformation into Java code required serious effort.

In this paper we suggest a new approach to the application of HIGZ programs within the WWW. It is based on the package HIGW3 (**H**igh level user **I**nterface to the **G**rapics for **W3**) developed with the help of C++ and Java languages and which permits realizing functions of the HIGZ package within the WWW environment.

1. Java language

Java is an object-oriented programming language similar to C++ which was suggested and is under development by SUN Microsystems [2]. Program codes written in Java are compiled not into the code of a concrete processor but into the byte code – the Virtual Java Machine (JVM) code. JVM contains the byte code interpretator and the Just in Time Compiler (JTC), which permits to compile a byte code into the processor code during its running.

Another feature of Java is the dynamical assembling of a program code. Objects (classes) are linked into executable code during its running. The standard Java library contains different classes starting from a simple input-output operation up to the powerful Graphic User Interface (GUI), which provides for the possibility of working with Internet and Multimedia.

Since the most modern WWW browsers contain the Virtual Java Machine, program codes written in the Java language can be simply reloaded via the computer network and run on a local computer.

2. HIGW3 library

For most program codes there exist sufficient opportunities put at users disposals by the standard Java library. Unfortunately, much program code has been developed at CERN and at other scientific centers with the help of the HIGZ package. Some of these programs have been directly updated to the Java code [3], but each time such work required too much effort. This has stimulated us to develop a Java version of the HIGZ package.

HIGW3 reproduces a whole set of HIGZ subroutines and resends the input-output from a local computer directly into the "body" of the WWW document running on a remote computer.

The procedure of linking and running the HIGW3 programs is the following:

1. The HIGW3 library is used, instead of the HIGZ library (the case of the HIGZ program), program linking takes place.

2. The HIGW3 Java applet is inserted into the body of the WWW document, one for all executable programs. Below, an extraction from the WWW document is presented:

```
...
<div align=center>
<applet code=JHIGZ.class width=300 height=240>
<param name=program value="vertex">
</applet>
</div>
...
```

3. The program manager (jhigzd) of the HIGW3 library is started on the WWW server (on a computer where there is the WWW document). It stays in the waiting regime all the time, and on a request from the Java applet starts the HIGW3 program on the WWW server [4].

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References

[1] CN/ASD Group. HIGZ Users Guide, CERN Program Library, Q120.

[2] http://java.sun.com.

[3] http://nuweb.jinr.ru/LNP/NEMO/tspN.html

[4] http://linserv.jinr.ru/~budnik/vert