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## Monitoring Network Activities in Web Based Training Courses

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**Abstract** - Because it is very important to have a proper image of all activities dealing with the field of electronic packaging, the aim of the current paper is to present a model of how to monitor educational and research activities in an Integrated CAD Environment. The system described in this paper is a client/server application, has an easy to use interface, and a secure database. Such a system is a necessity in an academic environment because is a tool for a better evaluation, for making statistics with the most accessed sites, for avoiding troubles made by students who speculate system's or network's weak points.

**Keywords:** monitoring application, client/server architecture

### I. INTRODUCTION

The problems of electronic packaging may cover a large area and represents "The engineering discipline that combines the engineering and manufacturing technologies required to convert an electrical circuit into a manufactured assembly. These include at least electrical, mechanical and material design and many functions such as engineering, manufacturing and quality control." [1]

Shaping the students for designing and manufacturing of electronic packaging involves an interdisciplinary and multidisciplinary approach. In this context, there are at least two important aspects: one of them is the teaching and the other one is the evaluation of the acquired knowledge. These two activities concern all the students involved in educational activities, especially in CAD-CAM-CAE because they define the high performance in human resources. All this implies persons responsible for education with a lot of qualities as high qualification, creativity, patience and talent. Beyond this, sometimes the educational process involves a great amount of work routine, which could lead to professional one. Many of these problems could be avoided by using a Computer Added Instruction (CAI). Through such a software application the computer can take over a large part of the routine and consequently teachers could afford to spend more time for creativity and for a better

understanding of the educational process of each student. [2]

As part of our efforts to increase the quality of education in Electronic Packaging, our team has developed a flexible software platform which consists of two operational programs: a server program and a client program and the client program has three modules: for monitoring laboratory activities, applications opened on workstations and web traffic.

### II. GENERAL ASPECTS OF THE SOFTWARE PLATFORM

Why would be necessary such a monitoring instrument? A few reasons could be: the pursuit to understand the assimilated information, the improvement of student evaluation system, research activity not to be disturbed by other unwanted activities (file deletion, file coping, database altering, etc.).

The monitoring is not a restrictive instrument for the activity or the research direction chosen by students; it is an early correction and rectifying instrument of eventual errors in the training process.

The software application MA-ICADE (Monitoring Activities – Integrated CAD Environment) is a client/server application which can be accessed and used from school laboratories. A client is a computer that queries, through a message, another computer, named server, for information or services. The server, through another message, delivers the information or services to the client, the whole operation being transparent to the user.

Programming languages as Delphi, PHP (recursive acronym for "PHP: Hypertext Preprocessor") and HTML and also database free tools as MySQL and Apache Server were used in order to develop MA-ICADE Software. In order to monitor the web traffic was used SQUINT – a free application from the Internet because it offers daily, weekly and monthly reports of the Internet activity in the network.

Fig.1 presents a logical diagram of the MA-ICADE SOFTWARE APPLICATION that emphasizes the

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main parts of the application and the relationships among modules.

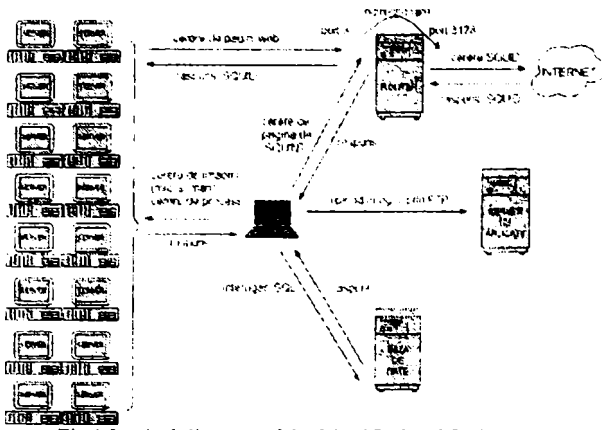


Fig.1 Logical diagram of the MA-ICADE SOFTWARE APPLICATION

workstation is on, or if the server program is on. If not, an error message will be posted on the professor display.

This program has been done exclusively in Delphi.

#### IV. CLIENT PROGRAM

The program opens with a splash form which presents the name of the application, the version, the owner and the logo.

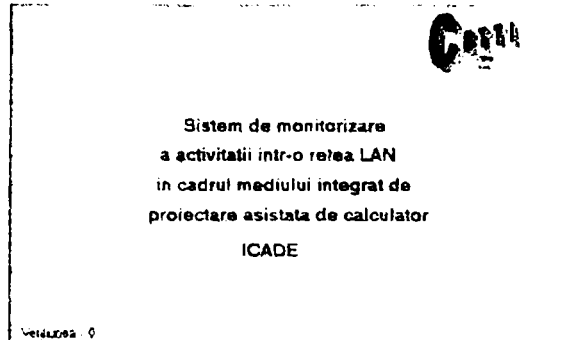


Fig 3 Splash Form

The server program runs on the student's workstations and the client program runs on the professor's workstations.

Each module from the client program has its benefits. Certain problems, created by ingenious students which speculate errors, can be avoided.

The MLA (Monitoring Laboratory Activities) module is useful for a better evaluation of the students. Long term evaluation applies, because the punctual one does not reflect the acquired level of knowledge.

The AOW (Applications Opened on Workstations) module permits to see what applications are used at a specific moment of time.

The WT (Web Traffic) module permit restricted access to some web pages and also to make statistics with the most accessed sites. It can be done a cache with the most accessed web pages in order to manage rapidly the informations.

The access to this program is granted after a successful login. Different operations (switching between modules, saving information on the database etc) can be performed by authorized persons.

Besides the friendly interface, the client program has also a help module who guides the user.

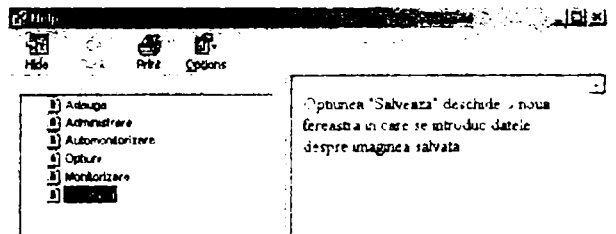


Fig.4 The help system of the application

#### III. SERVER PROGRAM

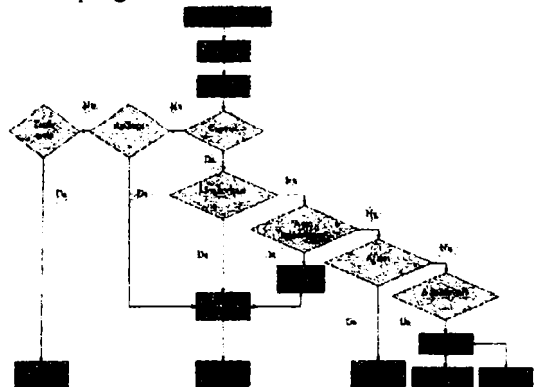
For the tests, the server program was installed on 16 workstations. It starts with the operating system and runs in the background. Students can see an icon in the task-bar and they know their activity is monitored.



Fig.2 The icon of server program

The program receives requests from the client through HTTP protocol. All applications there are opened on the workstation. Before the request, the client program verifies if the

To better understand the way in which this program works, we have to look at the functional diagram of the client program.



-Fig.5 Functional diagram of the client program

Another important feature of the client program is the possibility of database management. Database management consists of several functions, which can be used only by authorized persons: administrator, teachers and lecturers. Database management is about changing, deleting and modifying the stored items. Fig.6 presents how a teacher is added, modified or deleted from the database.

Adauga profesor	Nume profesor	Parola profesor	Actiune
Modifica Profesor	Nume profesor	Parola noua profesor	Modifica
Sterge Profesor	Nume profesor		Sterge

Fig.6 Administrator's page

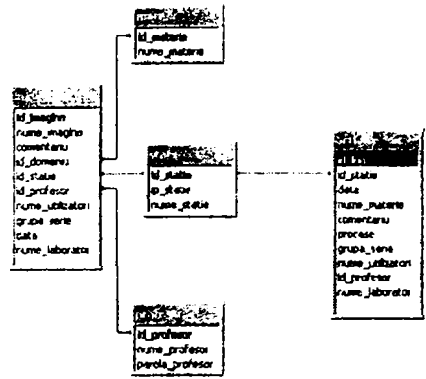


Fig.8 The application's database

Num Student	Proces
Num Lucrare	

Cauta
Nume Profesor: paul svasta
Materie: ccp
Nume Utilizatori: bogdan
Grupa: 451a
Comentariu: proiect de diploma
Nume Lucrare: lab2
Sterge

Fig.7 Teacher's administrative page

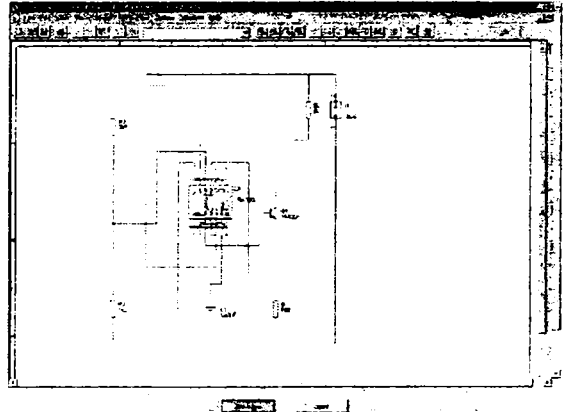


Fig.9 A screen shot from a workstation

This program had been done using Delphi, PHP and HTML: contains Delphi written code –for laboratory activity and local stations supervision, contains PHP written code –for database administration, contains HTML written code –for the application's help file.

**A. MLA MODULE**

The student's knowledge evaluation is one of the most important activities of the didactic process. The MLA (Monitoring Laboratory Activities) module is particularly useful for teachers and lecturers during this activity, as it helps, prevent time losses, subjectivism danger and occurrence of routine and redundancy, during the students' knowledge evaluation.

MLA module allows the instructors to simultaneously watch, on a single monitor, all the 16 station monitors on which the students work. Before attempting to take screenshots from a station, the program verifies if that station is on, through a ICMP package (Internet Control and Monitoring Protocol). It shows error messages when it is the case and it allows saving the captured images. Each print screen of students activities can be saved in a secure database and the professor can add notes in a table, regarding this activity.

**B. AOW MODULE**

Another functionality of the client program is referring to the applications opened on each workstation. It shows application lists opened in 16 list boxes. It has a popup menu for saving the application list. Not Connected or Error messages are printed. If students are working with application which are not designated for training activities they will be seen and in the future the teacher will have the possibility to close the unnecessary applications. The friendly interface permits the switching between modules. Buttons from the previous windows can be accessed as well as other functionalities of the application

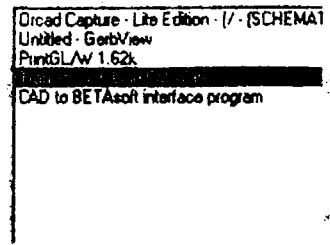


Fig.10 A list with opened application

For monitoring web traffic, it was chosen the Squint program. It presents daily, monthly and yearly reports of Internet activity. The following information is recorded: the number of downloaded bytes, the time on-line, the longest session of a user and a table with the time of Internet access. It presents a complete image of the accessed sites as well as links to those pages, time and downloaded pages

Internet access by 192.168.1.9 - Mon 24 May 2004

Time	Site	Min	Max	Time	Size
07:29	192.168.1.9	0:00	0:00	0:00	0:00
07:30	192.168.1.9	0:00	0:00	0:00	0:00
07:31	192.168.1.9	0:00	0:00	0:00	0:00
07:32	192.168.1.9	0:00	0:00	0:00	0:00
07:33	192.168.1.9	0:00	0:00	0:00	0:00
07:34	192.168.1.9	0:00	0:00	0:00	0:00
07:35	192.168.1.9	0:00	0:00	0:00	0:00
07:36	192.168.1.9	0:00	0:00	0:00	0:00
07:37	192.168.1.9	0:00	0:00	0:00	0:00
07:38	192.168.1.9	0:00	0:00	0:00	0:00
07:39	192.168.1.9	0:00	0:00	0:00	0:00
07:40	192.168.1.9	0:00	0:00	0:00	0:00
07:41	192.168.1.9	0:00	0:00	0:00	0:00
07:42	192.168.1.9	0:00	0:00	0:00	0:00
07:43	192.168.1.9	0:00	0:00	0:00	0:00
07:44	192.168.1.9	0:00	0:00	0:00	0:00
07:45	192.168.1.9	0:00	0:00	0:00	0:00
07:46	192.168.1.9	0:00	0:00	0:00	0:00
07:47	192.168.1.9	0:00	0:00	0:00	0:00
07:48	192.168.1.9	0:00	0:00	0:00	0:00
07:49	192.168.1.9	0:00	0:00	0:00	0:00
07:50	192.168.1.9	0:00	0:00	0:00	0:00
07:51	192.168.1.9	0:00	0:00	0:00	0:00
07:52	192.168.1.9	0:00	0:00	0:00	0:00
07:53	192.168.1.9	0:00	0:00	0:00	0:00
07:54	192.168.1.9	0:00	0:00	0:00	0:00
07:55	192.168.1.9	0:00	0:00	0:00	0:00
07:56	192.168.1.9	0:00	0:00	0:00	0:00
07:57	192.168.1.9	0:00	0:00	0:00	0:00
07:58	192.168.1.9	0:00	0:00	0:00	0:00
07:59	192.168.1.9	0:00	0:00	0:00	0:00
08:00	192.168.1.9	0:00	0:00	0:00	0:00
08:01	192.168.1.9	0:00	0:00	0:00	0:00
08:02	192.168.1.9	0:00	0:00	0:00	0:00
08:03	192.168.1.9	0:00	0:00	0:00	0:00
08:04	192.168.1.9	0:00	0:00	0:00	0:00
08:05	192.168.1.9	0:00	0:00	0:00	0:00
08:06	192.168.1.9	0:00	0:00	0:00	0:00
08:07	192.168.1.9	0:00	0:00	0:00	0:00
08:08	192.168.1.9	0:00	0:00	0:00	0:00
08:09	192.168.1.9	0:00	0:00	0:00	0:00
08:10	192.168.1.9	0:00	0:00	0:00	0:00
08:11	192.168.1.9	0:00	0:00	0:00	0:00
08:12	192.168.1.9	0:00	0:00	0:00	0:00
08:13	192.168.1.9	0:00	0:00	0:00	0:00
08:14	192.168.1.9	0:00	0:00	0:00	0:00
08:15	192.168.1.9	0:00	0:00	0:00	0:00
08:16	192.168.1.9	0:00	0:00	0:00	0:00
08:17	192.168.1.9	0:00	0:00	0:00	0:00
08:18	192.168.1.9	0:00	0:00	0:00	0:00
08:19	192.168.1.9	0:00	0:00	0:00	0:00
08:20	192.168.1.9	0:00	0:00	0:00	0:00
08:21	192.168.1.9	0:00	0:00	0:00	0:00
08:22	192.168.1.9	0:00	0:00	0:00	0:00
08:23	192.168.1.9	0:00	0:00	0:00	0:00
08:24	192.168.1.9	0:00	0:00	0:00	0:00
08:25	192.168.1.9	0:00	0:00	0:00	0:00
08:26	192.168.1.9	0:00	0:00	0:00	0:00
08:27	192.168.1.9	0:00	0:00	0:00	0:00
08:28	192.168.1.9	0:00	0:00	0:00	0:00
08:29	192.168.1.9	0:00	0:00	0:00	0:00
08:30	192.168.1.9	0:00	0:00	0:00	0:00
08:31	192.168.1.9	0:00	0:00	0:00	0:00
08:32	192.168.1.9	0:00	0:00	0:00	0:00
08:33	192.168.1.9	0:00	0:00	0:00	0:00
08:34	192.168.1.9	0:00	0:00	0:00	0:00
08:35	192.168.1.9	0:00	0:00	0:00	0:00
08:36	192.168.1.9	0:00	0:00	0:00	0:00
08:37	192.168.1.9	0:00	0:00	0:00	0:00
08:38	192.168.1.9	0:00	0:00	0:00	0:00
08:39	192.168.1.9	0:00	0:00	0:00	0:00
08:40	192.168.1.9	0:00	0:00	0:00	0:00
08:41	192.168.1.9	0:00	0:00	0:00	0:00
08:42	192.168.1.9	0:00	0:00	0:00	0:00
08:43	192.168.1.9	0:00	0:00	0:00	0:00
08:44	192.168.1.9	0:00	0:00	0:00	0:00
08:45	192.168.1.9	0:00	0:00	0:00	0:00
08:46	192.168.1.9	0:00	0:00	0:00	0:00
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08:50	192.168.1.9	0:00	0:00	0:00	0:00
08:51	192.168.1.9	0:00	0:00	0:00	0:00
08:52	192.168.1.9	0:00	0:00	0:00	0:00
08:53	192.168.1.9	0:00	0:00	0:00	0:00
08:54	192.168.1.9	0:00	0:00	0:00	0:00
08:55	192.168.1.9	0:00	0:00	0:00	0:00
08:56	192.168.1.9	0:00	0:00	0:00	0:00
08:57	192.168.1.9	0:00	0:00	0:00	0:00
08:58	192.168.1.9	0:00	0:00	0:00	0:00
08:59	192.168.1.9	0:00	0:00	0:00	0:00
09:00	192.168.1.9	0:00	0:00	0:00	0:00

Fig.11 Web pages accessed from 192.168.1.9

V. COURSE OF DEVELOPMENT

In the future modification of the monitoring system and modification of the application as it can monitor other network structures will be done. It will also be implemented the possibility to send messages on stations. In order to develop a friendly application the help system will be modified.

VI. CONCLUSIONS

The main target of the MA-ICADE SOFTWARE APPLICATION is to support the teachers in evaluation and feedback processes. A proper statistic for test results is improving the educational activity.

As part of the actions that must be performed in the designing and manufacturing of an electronic package, Computer Added Design (CAD), Computer Added Engineering (CAE) and Computer Added Manufactures (CAM) are specific types of activities which need this kind of software. With MA-ICADE SOFTWARE APPLICATION an important amount of time can be saved.

Regarding the complexity of MA-ICADE, a very friendly interface is proved, to make it as simple as possible to use. A very important aspect of the MA-ICADE SOFTWARE APPLICATION is that it allows the possibility of feedback, which facilitates the tailoring of the educational process, and especially of the evaluation activity, on the students' particular needs, leading to significantly improved results for both students and didactic personnel.

The application is supported by any Windows version. The activity can be monitored from any computer in the network which has the client program installed. The screen resolution is unimportant.

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