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# **Mainframes are from Mars and PC's are from Venus**

## **University of Florida**

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Many people that are charged with making long-term decisions concerning computing platforms are not given the information required to make good decisions. Ignorance of the strengths of various computing platforms has caused many to err mightily.

The choice given is often to stay with the mainframe or exclude the mainframe. Mainframe computers are typically viewed by those who prefer other platforms as not user friendly and hard to change, other computer platforms are viewed by mainframe bigots as full of frill but with limited enterprise worth.

There are an increasing number of professionals realizing the power gained when a partnership is created amongst disparate platforms. They all have their strengths and can only be used to their maximum potential when teamed up to exploit these strengths.

The University of Florida has joined with outside vendors to harness the power, security and the interactivity of IBM's S/390 to the graphic capability and availability of the Web. Interactive student and administrative services are currently available on the Web. The near future will bring imaging and report distribution to the Web that was formerly available only through proprietary clients.

# **Mainframes are from Mars and PC's are from Venus**

## **Information and Background**

The University of Florida, located in Gainesville, is a major, public, comprehensive, land-grant, research university, founded in 1905. The state's oldest, largest and most comprehensive university, Florida has a long history of established programs in international education, research and service, and its enrollment tops 40,000 students.

Florida offers more programs on a single campus than all but a few US universities. Florida has 21 colleges and schools and more than 100 research, service and education centers, bureaus and institutes. More than 100 undergraduate majors are offered and graduate programs number almost 200. Professional degree programs include dentistry, law, medicine, pharmacy and veterinary medicine.

Registration, schedule adjustment and drop/add are currently done through telephone, Web, and 3270 terminals in the computer labs on campus. All of these utilize the same CICS/MVS v4.1 software that runs on a IBM 9672-R45, a four-way processor with 2 Gigabytes of storage. The main operating system is OS/390 (with JES2).

The University of Florida's goal was to put student information on the WEB. Last year, this was accomplished by using Edify's Corporation's Electronic Workforce to make available student information over the Internet. CICS running on IBM mainframe that provides text based data via 3270 screens. Intel based Edify transforms these screens into an attractive, accessible, visually pleasing, user-friendlier interaction. A "touchy-feely" experience offering the appeal of professional presentation, the expectation of the University of Florida's standard of excellence.

## **Mainframes are from Mars, PCs are from Venus**

The title of this presentation is obviously taken from John Gray's best seller "Men are from Mars, Women are from Venus". The book is about relationships between men and women. He talks about the genders' differences, the conflicts that arise from the needs not met, the communication lost due to different expectations and perspectives. When the perceived weaknesses are realized and strengths are merged, the union provides creative solutions accomplishing what everyone wants, communication.

### ***Mainframes: Martians***

In his book, Gray refers to men as typically problem solvers without feeling. The mainframe, like "men", process data with minimal attention to presentation. Mainframes are the dominant computer used in most large universities. They provide information without frills, presentation without emotion. This is comparative to Gray's perspective of men and their existence as Martians. He says in his book that life on mars would "value power, competency, efficiency, and achievement." Mainframe computers, like Martians, are defined through their ability to achieve results rather than a relationship.

### ***PC: Venusians***

Gray explains that women are “Venusians” with different values. They value love, communication, beauty, and relationships. They spend a lot of time supporting, helping, and nurturing one another (Gray, 18). The Venusians are like the PC, intuitive, attempts to anticipate the needs of others and meet the needs without being asked. Intuition is more of a Venusian style of communication.

The examples given in this session are exaggerated. Clearly mainframes are not completely devoid of some of the PCs capabilities and PCs are not completely deficient of some of the mainframe’s capabilities. The emphasis, however, is on the strength as a result of the marriage of the two. Fortunately we have the perfect medium to foster a marriage between the PC and mainframe, the Web.

## **The Necessity of the Mainframe**

The University of Florida has an extensive existing infrastructure for student records on the mainframe. There are over 1800 interactive CICS screens that allow administrative staff anywhere on campus to view and update student information. There is also a large amount of batch processing that executes on a nightly, weekly and termly basis. Tools have been created specifically to maintain and automate many of the registrar and admission functions. More are being created daily. The vast majority of this automation is on the mainframe.

There are several special CICS applications that enable the college and department staff to be responsive to the students’ needs. Through this infrastructure, college and department staff may:

- Update degree requirements
- Grant student course substitutions toward their degree
- Design prerequisites for courses
- Add department-controlled sections and courses
- Authorize students to register for department-controlled sections
- Update enrollment capacities for course sections
- Access on-line class rolls
- View a student’s holds
- Place and remove the college’s student record holds
- Immediately be notified via e-mail when all the sections of a course have been filled
- Admit and deny admission to upper division majors

Along with all the other student records applications college and department staff may assist students by:

- Registering for a student
- Dropping or adding courses
- Searching for open sections of general education courses
- Overriding some of the built-in course registration features like:
  - Time conflicts
  - Course prerequisites
  - Maximum course load
  - Section capacities (up to room capacity)
  - Registration appointment times for department-controlled sections

## **The Necessity of the PC**

Most people are more familiar with the look and feel of personal computers than that of mainframe computers. Making more friendly applications for the casual user as well as the expert users is strength for the PC. Applications on the PC are built to be more intuitive and easier to navigate. Data publishing tools for the PC allow programmers to create computer programs that present information to the people who need to see it in an easy-to-read, appealing form. In the recent past, this was mainly done on the PC through a client server model. This offers a ‘point and click’ ability to retrieve information without having to type any cryptic commands. The information retrieved does not have the limitation of fitting on a 24X80 character screen but can be viewed as a complete document formatted in a way that maximizes readability. These features are critical and must be exploited to successfully provide for the needs of future generations of users.

## Marriage of Platforms

The initial opportunity posed to us, as a mainframe centric environment, was to have an user-friendlier environment for an increasing number of casual users. These users only need occasional access to student's records. Because this is not a major part of their job, the interface they use to access the student records system has to be more intuitive. Previously our main user group was expert users whose primary need was function and performance. They were educated on the use of the 3270 CICS screens and batch output. When they were trained, their tasks could be accomplished efficiently and accurately. Now there are several groups of users accessing the same data. They all require accurate real time data but their levels of experience are very different. Our task is to provide comprehensive access for all of these groups in a way that fits their level of expertise.

One new group of users is students. They are requiring more and more real time access to their personal information that is stored and processed on the mainframe. Access to registration, schedule adjustment, current degree status, holds, fee assessment, financial aid and access to grades, schedules, transcripts, degree shopping and admissions status have been available using real time production data. In the past these services were mainly accessed terminals located in the computer labs on campus. The future points to accessing this data from anywhere at any time.

### Giving the Mainframe CICS the Full Function of the Web

There are several ways to provide Web access to data stored on the mainframe. This data can reside in a myriad of databases or even in non-data base formats such as VSAM. One way to access this data is to write a Web system to directly access the mainframe data. It may be the 'live' data used and updated by the administrative staff of it could be a summary of this data that has been saved in a data warehouse specifically designed for this type of access. There are several vendors that have written software to directly access mainframe data regardless of the data format. Special mainframe programs can also be written to process requests made from the web to display and update the mainframe data. One important consideration, there are many, is the extent that you want to use legacy system processes. Utilizing these existing systems was the main reason the University of Florida uses a middle ware product written to run on an Intel based PC to create an intuitive user-friendly Web interface to the legacy mainframe CICS programs and data.

Currently UF's primary technique of providing this access is 'screen scraping'. There are several reasons to employ this method of retrieving and updating mainframe data. Although this is a much-maligned approach, it is very effective and does not require a rewrite of existing systems that are stable and accurate. The software we use is Edify Corporation's Electronic Workforce. It can read text screens and build an appropriate Web page, send it out to the browser and wait for a response. When the response is received, the Edify software can be written to type the response on the screen and press 'ENTER'. This is a very simplistic but appropriate example.

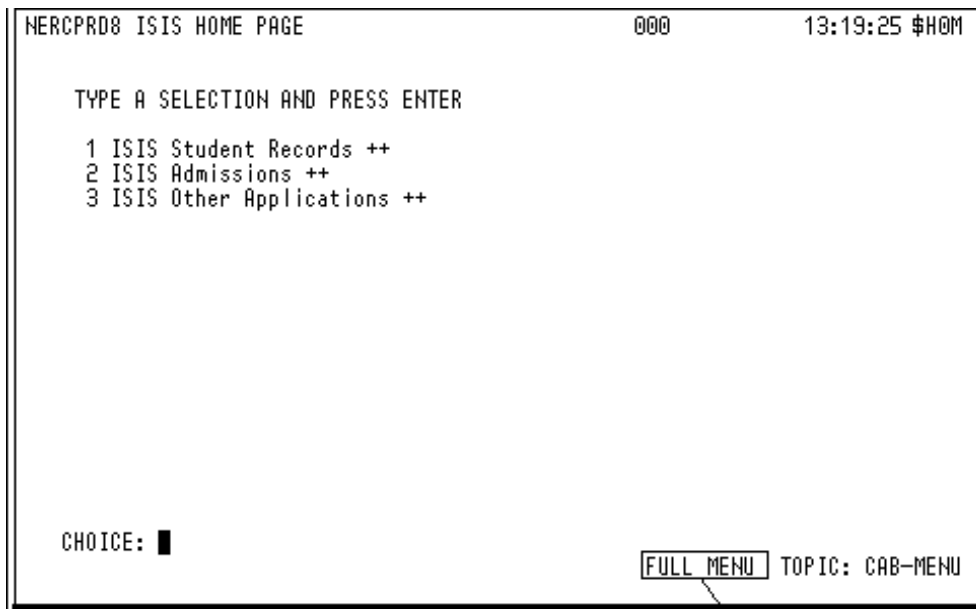
Implied in this illustration is the 'state' of the interaction between the person's browser and Edify. The standard application on the Web does not establish a continuous connection to the user's browser. Typically, after the Web page is sent the connection is terminated.

Our current CICS transactions operate in the same manner. A command is entered and the CICS application processes it then stops. What remains after the task ends is the 3270 terminal session that is attached to CICS. CICS tracks the status of this 3270 session. The resulting situation is the need to retain the connection between these two independent processes providing a seamless access to all the data requested without repeatedly reacquiring their userid and PIN or password. Edify has been able to successfully fulfill this obligation. The Edify application knows where the information came from and which many active 3270/CICS sessions to type the response.

There are too many details about how Edify allows the establishment of this dialog between the browser and the 3270 session to discuss fully in this paper but here are some highlights. Edify uses "Agents". When activated by the Web request, these agents run constantly. This allows the ability to end a session if there have been no requests from the browser in a set period of time. This also facilitates the association of the Web browser and a particular 3270 session. Further, tracking of what the student is actually doing during their visit and the duration of the interaction as well as access to other valuable information is made possible.

One of the challenges encountered when creating the Edify application, is that the CICS screens that provide the student interface, EXPERT, is in a constant state of change. New features and functions are being added consistently. There are also features that are offered only at certain times during the registration process. There also are other offices on campus utilizing EXPERT to allow students access to their data. Edify has to be able to effectively respond to every change. The task of creating a Web application that could respond to these changes without additional coding was made even more daunting due to the fact that no additional programmers would be hired to maintain it. Fortunately, Edify's product was able to facilitate such an application.

EXPERT uses a consistently formatted screen. This eliminates the need to create a unique HTML page for every screen. Currently EXPERT is comprised of approximately 800 screens. Less than 10 unique Web page templates needed to be created to display all of them. EXPERT determines the style of Web page to be displayed through a 10-byte control field that is displayed on all of its screens. If this field is left blank or is unrecognized, a 'generic' Web page is created by Edify to display the EXPERT screen.



**Control Field**

This is a typical screen displayed by EXPERT. The control field that has been mentioned determines which template will be used to build the Web page. The following pages give some examples of EXPERT screens and how the Edify application transforms them into Web pages. The graphic on top is the EXPERT screen followed by the resulting Web page. The examples focus on the use of the control field to determine the layout of the Web page.

When the data from the screen is simple and there is a simple request for input, DATC is used.

```
NERCPRD8 ENTER SOCIAL SECURITY NUMBER TO SIGN ON  @@@          14:03:40 $H0M
To ensure the privacy and security of your record, please type your
social security number (SSN), without dashes.
For GUEST access, type GUEST in the SSN field.
Press or Click ENTER to continue.

SSN: █

                                     DATC          TOPIC: SST-SSH
```

**Input field header**

The resulting page displays and centering each line of text. An Input Box is normally placed on the Web page. The 'input header field' determines the type of input box is included on the Web page. If 'SSN', 'PIN', or 'PASSWORD' is in the input header field, a 'password' type input field will be on the page. If "ENTER" is in the input header field on the CICS 3270 screen, no input field will be on the Web page. If neither of these conditions is met, a standard text input field is placed on the page.



If there is a need to select from a group of options or enter the required data, the following control area format may be used:

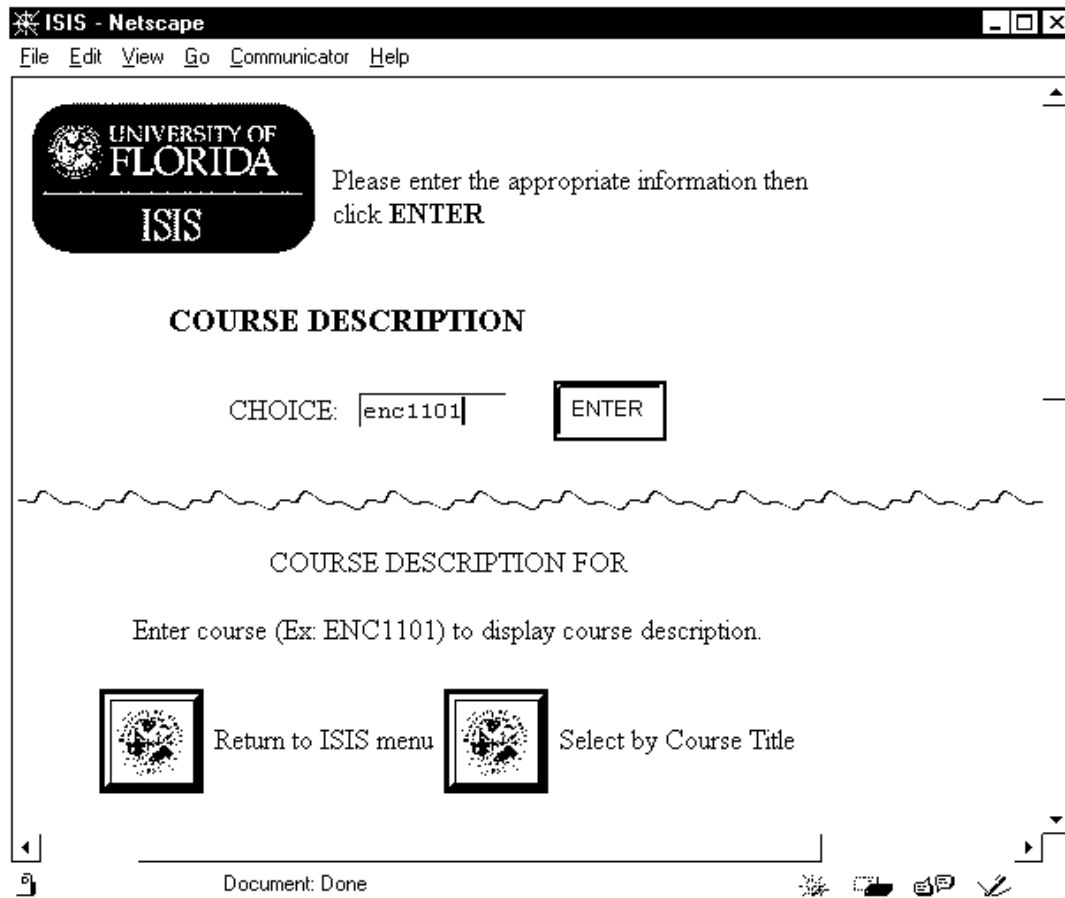
The result is that in addition to the centered text and the input box, the list of selections listed on the CICS 3270 screen are

```
NERCPRD8      COURSE DESCRIPTIONS      000      15:52:30 $HOM
                COURSE DESCRIPTION FOR  ENC1101
Instruction in uses of writing for thinking creatively and critically in a
multi-media society. Critical use of readings, library research, oral
presentations. 6000 words min. (C)

Enter course (Ex: ENC1101) to display course description.
"1" Return to ISIS menu
"2" Select by Course Title

CHOICE: █
ALLIGATOR ALBERTA      YOUR SESSION ENDS AT 18:52      DATCMENU03 TOPIC: SST-CDES
```

replaced by a group of click-able icons.



The tree-like structure of EXPERT makes it necessary to create a way to display a menu. If this menu screen changes in EXPERT, the Web would immediately reflect the change.



Edify interprets the text on the screen and displays click-able icons followed by the text from the screen.

There are also conventions established to dynamically cause a list of features to be listed under a particular menu item and cause a new Web browser window to display a new link.

### Security

Edify uses Secured Socket Layer, SSL, data encryption to insure privacy of the data during transmission of the student data to the browser. The Edify application also benefits from the security of the EXPERT application as well. Edify has no special access to files or screens. It simply utilizes the same software made available to the students in the computer labs on campus.

The transformation of the CICS data to Web data required research and vision. Fortunately, the University of Florida was able to add the Web face to their existing applications without a major reconstruction of their IT staff. There was no need to duplicate the enormous amount of data and programs needed to maintain two systems. Now the wealth of existing business logic and programmer experience and also has the power, security, and availability of CICS can be maximized through the user friendly environment of the Web.

### Marriage of programmer's perspectives

This is clearly the more difficult marriage. It requires trust, openness to change, and a desire for creative solutions and growth into the future. Even as this paper is being written we are exploring alternatives for providing the best and most comprehensive access to both our students and staff.

## **Conclusion:**

The theme of CUMREC '98 is "Preparing for Information Systems in the University of the Future" and the marriage of the mainframe with the PC does exactly that. It offers major universities with effective legacy systems a more user-friendly presentation. Students and programmers are enabled to "fly within virtual worlds" without getting "caught in tattered webs". This technological infrastructure is the future of student information systems.