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COMMputer

A Distributed,

Highly Hardware-Independent,

Relational Operating Environment

for

Personal Computers

-- Preliminary Implementation on Athena --

UROP PROPOSAL:

(draft)

by

Michael B. Parker, MIT '89

1 February 1987

Massachusetts Institute of Technology

1. "COMMrades of SoftSolve" Group Mail Quotes

13 October 1986: *To: xmsgs@athena cc: mbparker@charon Subject: HELP DEVELOP COMMputer, AN OPERATING SYSTEM WHICH SPEAKS YOUR LANGUAGE --------*

Personal computers are cheap and convenient, but not very powerful as stand-alone units. But, like people, together they are strong, could share data and resources in a network so tight, that they may approach or surpass the power of mainfraims...

The new group COMMrades of SoftSolve are dedicated to making this dream come true. We are developing COMMputer (COMMunications comPUTER), a networked, distributed operating system on PC's maintaining a single, unified data structure. This "freeware" product would be as easy to use as possible, but its inherent simplicity would lend it great power. You could send a letter as easy as you could cut-and-paste on your word processor. You could access a wealth of data sharing with other PC's and perform sophisticated seaches (all in the background, for the system is concurrent). You could look at any information immediately (even the internals of your program AS it runs), simply by opening another window. And most importantly you could express your most complicated ideas and thoughts easily and concisely, because of the powerful graphical structure of the data.

COMMputer is being designed to free the user as much as possible from having to worry about the actual operation of the hardware. You do not have to be bothered with the kind of machines (COMMputer does all the interfacing), the location of the machines (COMMputer does all the navigating), and the communication between the machines (COMMputer does all the talking). If information on a machine is not current, COMMputer sees to it that it is updated. If there's not enough memory space, or a machine is too busy, COMMputer sees to it that the load is shared. And that really takes the load off you, so you can be creative, productive, making the machine work for you, and not the other way around.

But all this power and freedom is talk unless someone helps make the dream come true. We COMMrades of Softsolve have some fairly clear ideas of how this all could be done. And we are confident it can be done. But we also would love to have you join us, for many of these exciting and revolutionary ideas still need further brainstorming, design, implementation, and testing. Much like that individual PC, it can't be done alone.

If these ideas excite you, if YOU want to be a part in making these computers of the future come true, come join us in our weekly Saturday meetings, or send mail to the COMMrade account. Help design the SoftSolve COMMputer, and help computers help people COMMUNICATE!

COMMrades of SoftSolve

mbparker@charon

Sponsor: Michael Benjamin Parker (mbparker@speaker.LOCAL) Secretary: Laura Marie Ryzowicz (lauramr@speaker)

Weekly Meetings: Saturdays at 4pm / (617) 494-0483 or x5-9674 Random Hall, Rm. 245 and 2nd Floor Kitchen

PIZZA (your choice of toppings) and DRINKS will be served.

23 January 1987: To: melissa@athena.mit.edu Cc: mbparker@athena.MIT.EDU Subject: Re: Application for Developmental Account Date: Fri, 23 Jan 87 02:28:59 -0500 From: mbparker@athena.MIT.EDU

RE: Precisely what is "COMMrades of SoftSolve" and what is its affiliation to MIT?

Dear Melissa:

That is what I wanted to talk to you in person about.

At the beginning of last term I founded "COMMrades of SoftSolve" as an independent group (not an official MIT group), yet I and all the members of our group are MIT students (though we have not tried to be exclusive) and we have held meetings at an MIT dorm (Random) and used the MIT facilities (charon). I have avoided trying to make the group an official MIT activity so that when a product is finially completed, it will be in the name of those who created it, not MIT as a whole (however, if COMMputer were to be given to anyone, I'd prefer it be given to MIT). This is not a profit-motivated event, as I hope the final system will be distributed "shareware" for all to use and enjoy. This is why the group is "COMMrades of SoftSolve", not "COMMrades of MIT".

Through the semester and IAP the group has grown from just myself and a friend to about 38 MIT students. This number is somewhat misleading however, as at any given time about 4 to 7 people of those 38 are active in the group.

Our purpose is to "help computers help people", and to do this COMMputer has been conceived as an operating environment which allows different computers (as small as PC's) to COMMunicate easily and transparently; we have also set up a special data structure that, as well as serving many purposes in programming, encourges new forms of communicattion and new expressions of information creativity (such as writing and talking and expressing complex, interrelated ideas). Lastly, we have done our best to "take the hardware out of dealing with computers" and simplify them...

With COMMputer, the average person can sit down at his PC, talk with a friend, update his family's geneology relational database, check to see if anyone is selling the bicycle he is looking for (and if it has sold), and research and write (and later automatically publish) his book relating how Ghandi's similtaneous effect on Martin Luther King and on the English Parliment effected the American civil rights laws and customs. In COMMputer, most of the forementioned can be done with about 5-10 commands, and learning an additional 10 can allow a person to start programming his own as well.

Shared data, machine independence, and a simple but powerful data structure are the advantages of COMMputer. There are quite a few disadvantages, too. The major one is effiency: data is shared, but a typical character in our first implimentation will occupy 24 bytes; what's more, the early versions of the system will be quite slow, having to transfer and maintain all this data. But perhaps worst of all is that COMMputer is radically different from existing operating environments, which may make it uncomfortable for people (especially programmers) who are not used to such changes. At best it can be run as an application in existing systems, but will not communicate much with existing applications unless programmed specifically.

But for those who are new to computers, and there are many, I feel the simplicity and power of

COMMputer will be greatly appreciated, much as the Macintosh is to new PC users, and probably more so.

COMMputer doesn't use any special technology, it doesn't need any special machine, it's just puting old ideas new uses, perhaps uses tradition has kept us from thinking up. It involves a lot of messy programming (as shared data management) which I have a feeling many programmers have just avoided tackling. Yet the hard work to build COMMputer WILL pay off, as it will help many people. That is why I am doing it.

So that's our story. I know "COMMrades of SoftSolve" is not an "official MIT activity", but I sincerely hope someone as yourself, who has the power to make that dream I mentioned a reality, see some merit in COMMputer.

2. Introduction

Originally conceived as merely an improved form of Bulletin Board for personal computers, COMMputer has evolved a long way in but a year's time into a full-scale operating system and group project. Nevertheless, the goal of COMMputer has been the same all along, to "help comPUTERS help people COMMunicate".[1] Made for the ordinary person who does not want to know how many bits in a byte, who just wants to get the job done, COMMputer attempts to tie together ordinary computers in a simple and straight-forward way. The computer does all the bookkeeping and housecleaning, so the human is freed to do the real work, to be creative and expressive.

The final goal of COMMputer is to help realize the "electronic home and office" (or perhaps then they will be the same thing), where most any information (from programs to news to music to films) can not only be obtained, but through a balanced and distributed network, created, edited, and shared. An intermediate goal of COMMputer is to impliment an operating environment for PC's which will provide for some of the features of this electronic exchange, so that users could develop their own uses and a cultural interest in this new technology could develop.[2] A preliminary goal of COMMputer is a multi-user, multi-window relational editing (and perhaps programming) environment available on Athena. It gives the feeling of what COMMputer will be like without actually being distributed across PC's. It is happening *now* and is what this UROP is all about.

[1]In our growing information society, it is my belief that communication is the key to social harmony.

[2]Though to develop the software to make this dream come true is far from easy, a much greater challenge is to gain popular acceptance for this new communication form.

3. Preliminary COMMputer

After carefully brainstorming and experimenting off and on for about 11 months, I implemented and debugged the preliminary version of COMMputer over December and January IAP (IAP Activity #1520). The program still has a few bugs and needs a little polishing up, but should be ready for release on Athena in just a few weeks.

Using a central database and the UNIX Remote File System, the preliminary COMMputer program "commputer.c" is a simple multi-window outline-like text editor that allows text to input, edited, structured, and viewed by any number of people at once. It can be used to organize and literally tie together ideas, set up a relational database (minus searching and macros), do project scheduling (minus date types and calculations), experiment with new forms of concurrent-plot writing, computer confrencing (real-time) and send electronic mail. There are probably other uses, but as COMMputer, much like LEGO's, is intended to be a creativity toy, I'm sure they will be found by the users. The preliminary version as it stands now does not have any real programming capability and is faily slow, but its shared, relational data structure (it really edits doubly-linked loops, not text) leads to its many applications.

As the editor is largely written in its own data structure, it has some nice side effects. It maintains a private directory for each user. Different users may share screens or windows which move in synchronicity. The data is automatically backed up in the background, and there is no need for saving (or loading, for that matter). When a user logs in, all the windows and their contents are displayed as they were when he or she logged out. Indeed, the computer may fail at most any time and it is not likely that any information will be lost, and will seem as if the user had logged out normally. Since the package uses the "curses" C screen package, you do not need a graphics VAX Workstation and can run the program from most any terminal, local or remote. For easy learning, the program uses less than 20 single-keystroke Emacs-like commands to do all is operations.

Though all this power and simplicity may sound far out, it is really nothing new in computer science terms and it behoves me why it hasn't been done sooner. Internally, the preliminary COMMputer editor is just a disk-based, doublly-linked loop structure editor, all data kept in a central file which is immediately updated; it merely displays a single loop in each window and sees the window is kept updated (WYSIWE[3] philosophy). It seems to do amazing things but it is nothing special, uses no new technology. It is pretty slow now but can easily be optimized. Hasn't it ever occured to anyone that these data structures, which are so useful for organizing computer programs and information, would also be very handy for daily communications? It's not that sophisticated; why isn't it everywhere already?

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[3]"What You See Is What Exists"

4. Why UROP?

This is one of the reasons why I chose to make this project a UROP. I have a lot of ideas and little experience, and it is difficult to judge if a long-shot idea is a winner or had I just missed something along the way in my dreaming. In other words, I would like a supervisor who could look at my project objectively.

Another reason is that the name "UROP" seems to command a lot of respect around the MIT community. When I offered to hire people to work on my project, I found they would not take my money as it was out of the pockets of a fellow students; yet they also could not put in a serious commitment to the project, as they had other obligations (notably UROPs) to attend to. Therefore I felt making COMMputer a UROP would provide the funding, supervision, and respect to build a real development team.

I understand how recognition is important to the team members, and this is also a primary reason why a UROP attracted me. It seemed that I was not getting much recognition for the developmental projects I've worked on at MIT (as data compression during my freshman year), perhaps just because the works never had a title (like UROP) which people could relate to. It is terribly lonely working at 3:30 in the morning in an empty terminal room, on a project which could do great things but until it is finished, no one seems to notice. I have worked years on large projects driven by no more than my own motivation, but it is nice to know someone cares about what you're doing.

Lastly, since I have been at MIT, I've been torn between my priorities for my projects and for my coursework. My interests and my studies never seemed to be in coorespondence, even though they were both rather academic. A UROP, however, may be the ideal fullfillment of my New Year's resolution to integrate the two.

Why haven't I started a UROP sooner? Bullheaded, as I sometimes am in my enthusiasm, I was under the impression that if you worked under a UROP or used MIT facilites, you would loose all your legal rights to the work you did. Last week, to my astonishment, I learned this was not the case. Indeed, according to the UROP Office, UROP students generally retained all their rights to their projects. Estatic that I might have a supervisor, project funding, UROP status and recognition, and credit or pay AND still maintain the rights to my project, I immedately went on the hunt for a supervisor to start the ball rolling!

It must be made clear, however, that I have sought these benifits for COMMputer rather than for myself. I never expected to get credit nor pay from my research (althougn, if a UROP gives me a choice, I would prefer credit), and plan to give the final product away via "sharware". My top priority is to see that COMMputer is developed and accepted. As I am fond of saying, "I know what the future holds and I can't wait!"

5. Preliminary COMMputer Goals for Spring 1987

As a UROP, I wish to continue work on COMMputer as planned, but now under the helpful guidence of a faculty supervisor, and perhaps with a regular group on a regular computer account with regular funding. With all these factors working for COMMputer, productivity should increase a great deal. Goals to date are:

1. Finish Debugging and Polishing Preliminary Implimentation of COMMputer
2. Release COMMputer on Athena; Write-Up Documentation; Hold Major COMMputer Demo; Publicize with fliers, posters, Athena messages, etc.
3. Establish Special Interest Groups (SIG's) based on COMMputer.
4. Notify Writing Project of COMMputer; How does it compare with the new Foundataions System?
5. Get feedback from users; How does it/does it not meed their needs?
6. Implement COMMputer as a truely distributed system on Athena; most of user's data is stored (transparently) in his or her directory.
7. Experiment with programming languages; work from Assembly-like commands and macros up.
8. Enhance Current Window Interface (& get feedback)
    a. New window managers (non-overlapping)
    b. Graphical arrows from pointers to objects
    c. Storage and display of graphical data?

6. Related Research

COMMputer was quite independently conceived and designed. Perhaps its development could have been faster, however, if I had known about related research. To list a few:

1. "HyperText", originally conceived by Ted Nelson in the early 1960's, and still under development by his somewhat anarchal company, *Xanadu HyperText*, which I've been trying to locate.
2. "Intermedia", now working and continuing development under the direction of Norman Meyrowitz of Brown University. (See Byte Magazine, February 1987 (Vol. 12, No. 2), p. 175-6)
3. "Foundations", the text editing system developed by Athena for the MIT Writing Project. It's first version was released at the end of last month and mainly provided text commenting, but future versions will probably be developed with more powerful features as text sharing.

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