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February 13, 1989

Mr. Dick Hanrahan
IBM Corporation
44 S. Broadway
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Dear Dick,

This is a letter to discuss some problems I think we need to address in OS/2 planning. It includes recommendations for a simpler future.

Today's OS/2 is a system with too little to recommend it to users over the Windows 3.0/DOS combination. However, the size of OS/2 is over 4 times as great. The development cost is over 20 times as great.

It appears that the situation is getting worse. Since shipping 1.1 a number of "requirements" have come up that people are considering dealing with by changing the operating system. I don't believe it is worthwhile to change the operating system to handle many of these issues. In some cases changing the operating system might be more elegant, but it doesn't make sense to be elegant for small user groups. There are 2 sides to this: technical changes to OS/2 and putting more software in the OS/2 S.E. package.

Examples on the technical side include Nervview PC support, CEL, advanced RAS, distributed file management, IPDS support, "faster kernel services", image, protected subsystems and record level I/O. Examples on the packaging side include a system editor, help, on line reference, REXX, and Metafile interchange code (like CGM, PIF). We won't ever have a good product unless we say no to virtually every one of these things and get them to handle their needs without slowing us down or complicating the product.

Unfortunately, today we don't have a mechanism or even a criteria that allows us to avoid these issues. Incredible effort is spent evaluating all of these "requirements" instead of looking at our current shortcomings and focusing in on the key areas. I believe the key areas are 386 support, objects, great file system, some security and networking. If someone thinks these features are not important or can be done in simpler ways than currently proposed, I am open minded.

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Let's consider the Dialog Manager. The proposed number of klocs in all versions is around 200 klocs. Its functionality overlaps many of the elements already in the system. This alone would add one diskette to OS/2. Popular applications will not use this subsystem. Office considered it at one time and decided it was not appropriate. It doesn't fit any definition of what is in an operating system.

On a personal computer, size of manual, number of disks, boot time and memory space are key issues for the success of an operating system. Comparing ourselves with Windows, UNIX and any other system we are already the largest. The trend is bad. I am told the system grew 20% from version 1.1 to 1.2. I was totally amazed when I heard this and so was everyone else, but no one was watching it to make sure it didn't happen. We should have some smart people spend their time avoiding this type of growth and bringing it back down. Most design bandwidth is spent on trying to discuss all the proposed new features. A group of architects with high IQ trying to keep this product small is urgently needed. I am saying that a lot of work being proposed is of no benefit, hurts schedule and quality, and that the user would prefer it was not in the standard package.

We have quality problems even beyond large size that deserve focus over many of the proposed features. The spooler, scheduler, limitations (threads, applications under pm), loader speed, boot time, system call overhead, metafile performance/size, utility quality and that they are non-graphical and several other things need to be improved to be competitive. Usability has suffered as more parameters are added to Config.sys and so many different application types have been created. Some quality issues are too hard until we have the new kernel rewritten in C (device driver model, overall cleanliness, protected subsystems) but the ones listed above should probably be dealt with before then.

The amount of memory for a user running IBM Office on top of EE with a single dialog manager application is over 4 megabytes today and will go past 8 megabytes over the next few years if we don't change. I am convinced that OS/2 will not succeed unless it can run several applications adequately in a 4 megabyte system. We will not achieve that without a change of direction. I believe the question of how a feature will make the product better than DOS/Windows is the one to ask.

The argument is sometimes made that a feature is part of SAA and so it must be put in OS/2. I certainly support all of these things being available for OS/2 if IBM wants to make them available. However, just because something is part of SAA doesn't mean a secretary using OS/2 should pay for it and worry about it. Except for compilers, there seems to be a force to try and put all elements into one box. This eliminates the freedom and competition that should exist in the software market for these elements. If a piece of code is only needed by a small set of users those are the users that should pay for it. Software teams can be motivated by having a product SKU that they are in control of and feel responsible for. IBM groups that just send code down to be put into the OS/2 SKU will not be operating in a "market" framework that both measures and encourages excellence.

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Someone has suggested that it works better to distribute application runtime pieces like Dialog Manager with the operating system instead of with the applications that use them. The opposite is the case and this has been proven many times in the PC business. Even assuming a reasonable percentage of users will run applications using the dialog manager some of those applications will require more recent versions than others. Application writers would rather have all the pieces in their package than force the user to go get a new version of the operating system if at all possible. If newer versions are upwards compatible from old versions then our .DLL mechanism allows for sharing. If the new version is not compatible, proper use of naming will avoid sharing. Packaging inside the OS cannot deal with this second case. Testing is substantially more complicated for application vendors if they can't force a specific version of runtime code to be used. This still allows them to share code if they want with a range of versions.

Let's look at some of the impacts of putting an additional package like Dialog Manager into S.E. Any future release of the operating system requires more testing. The system becomes harder to build and harder to comprehend for our own people. The function has to be considered for enhancements, whether relevant or not, which slows down our planning. Any bugs in this package require updating all the copies of the operating system in the channel. The documentation of OS/2, which people already ridicule (programmers and end users), becomes larger. More options are required on install. Localization takes longer--issues like Kanji support become substantial even if the particular piece is not popular in that market. Separate packaging will prevent the complex coordination that has to take place today.

I do not believe additional laboratories should be allowed to become involved with OS/2. Already issues like the shell and security are not being handled efficiently. If additional labs, like Cary or Gaithersburg, get involved we will find it hard to even know the names of all the people.

There is an upper bound on the number of klocs that a fast moving competitive software product should be allowed to have. I think talented people inside IBM and elsewhere stay away from projects that get over a certain size. We will certainly move a lot slower than UNIX if we don't cap increase in total klocs at something like 20% per year. Our current rate of increase is over 50%.

I think the action items out of this are:

1. Let's discuss it. I think we agree on a lot of these things. I would like to refine this and put it into a form we can present jointly to Cannivino and see if he gives us a mandate to make it happen. I want to make sure that Ballmer, Loucks, Cannivino, you and I all share the same thoughts because it will take all of us.
2. Let's do a hard core review of the POR to delete everything we can and force people to figure out how to develop and package without holding us back.
3. Let's get our architects chosen and in place. I think 4 people with 2 from each company would be best.

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4. Let's hold off on 1.2 for 2-3 months to focus in on size and quality. Putting it out as is will generate significant negative feelings about OS/2.
5. Let's increase the technical smarts of the people involved on OS/2 while reducing the total number and not adding any new laboratories.
6. Let's get the separate packaging concept accepted as a general principle.

I am committed to making OS/2 successful, and that is the sole motivation for these comments. I don't think it will be easy, but I think if we change direction somewhat it can be done. I look forward to discussing this with you.

Best regards,

Bill

Bill Gates
Chairman

WHG/sfr

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