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IBM OS/2 2.0 OR MICROSOFT WINDOWS -- WHAT OUR COMPETITION DOESN'T WANT YOU TO KNOW.

Windows or OS/2: Which one would YOU buy? That depends greatly on your perception, paradigm and point of view, as well as who you listen to and if you've actually taken a test drive. Let's get hypothetical.

Your son, who drives a Volkswagen now, is quite attracted to that shiny kit car in the airport lobby, especially since he'd enjoy putting it together himself. You, on the other hand, are more inclined to buy a Lexus or Infiniti, especially if it costs about the same or less. Neither of you is wrong. You just have different skills, experiences and points of view.

Likewise, IBM and Microsoft have different views of their markets, and there's room for both to compete. IBM's views come from a heritage that is based on a history of providing MIS with corporate solutions with more recent interests in consumer marketing (top-down). Microsoft's

heritage, on the other hand, is based on a history of providing individual solutions with recent interests in corporate computing (bottom-up). These different paradigms and views shape different strategies and opinions when comparing OS/2 and Windows.

Different opinions of OS/2 and Windows are also found in end user and consultant circles and in the trade press. Not everyone agrees with Microsoft's statements or tactics, and this paper contains very positive alternative views that show strong OS/2 support and prognosis. We hope it will re-open the minds of people who have only heard the Microsoft story or have not yet tried OS/2 2.0. We encourage them to see an OS/2 demonstration or install it on their own system to judge for themselves.

THE CHARACTER OF OS/2

"OS/2 2.0 is like a late-model sports car with a totally awesome new turbo-charged engine under an innovative sleek new body. In this way, it surpasses the popular windowing systems, such as Microsoft Windows, that merely put a new body over DOS's Volkswagen engine."(1)

The analogy can also represent OS/2 as a complete system designed for a balance of speed and endurance versus Windows as a kit that might be faster in the quarter-mile but lack endurance and driving ease. You may prefer the smooth and consistent performance of OS/2, while your son may get satisfaction from working with Windows. What's amazing is that they cost about the same.

THE CHARACTER OF WINDOWS

If IBM claims that OS/2 is so good and Windows remains a DOS shell, then why is there so much excitement over Windows? It is the first time many DOS users have been able to multitask their installed applications or use a GUI to experience the ease of use Windows provides over character-based systems. The IMPRESSION is "this must be the future."

Unfortunately, users begin to stretch the limits of Windows as they become familiar with it and want to do more than what it is capable of. That's when they experience many of the limitations of its DOS "chassis and engine."

THE OUTLOOK FOR OS/2

IBM expects that most advanced users and even many character-mode DOS users will shift away from DOS toward OS/2, especially when they upgrade their computer to a 80386 or 80486 based system that can support OS/2. Initial sales of OS/2 look quite promising, and most of those sales have been upgrades from Windows. But although OS/2 2.0 has shipped over 1 million copies in its first 4 months (almost twice the 1991 shipments of version 1.3), Microsoft still claims that it is only for niche markets.

"Recently, even Bill Gates publicly admitted that OS/2 2.0 will be

successful within 'niche markets.' Frankly, we agree with Bill -- OS/2 2.0 will be successful in a 'niche.' However, we disagree with Microsoft on how big that 'niche' might be. We believe the OS/2 2.0 potential to be as large as the population of installed 80386 and 80486 systems -- which will be over 23 million 32-bit Intel personal computers worldwide by year end 1992. This is a big 'niche.' Even if IBM is successful penetrating only ten percent of this installed base in 1992, it provides independent software developers with a substantial base of OS/2 users for which to write native OS/2 applications. ...

What Microsoft hasn't acknowledged is that Microsoft itself is actually the company that is seeding the success of OS/2 2.0. Corporate workers, small businesses and individual users alike, frustrated with Window's limitations, should be drawn instinctively to OS/2 2.0. It already delivers the capabilities that Microsoft is just now beginning to acknowledge are important... a true 32-bit operating system - that works the way individuals work - with the applications in which they have already invested." WORKGROUP TECHNOLOGIES, INC.(CONSULTANT), JANUARY 29, 1992.

WHAT USERS ARE SAYING ABOUT OS/2

OS/2 WORKS... WELL.

"I'm sold! I didn't think I'd be saying this, but I'm a believer. I have become so callous towards the empty claims of software vendors that I flat out refuse to even hope for a feature until I've tried it myself.... Congratulations for doing it right.... We believe this type of environment improves productivity and lowers training costs, so we began the move to GUIs almost two years ago... You have delivered on your promise, given us a migration path that makes sense, and because of it the entire computing world will come knocking at your door (not window). Thanks!"
NORTHWESTERN NATIONAL LIFE INSURANCE - JERRY WALKER, SENIOR ANALYST

OS/2 IS FAST, STABLE, & EASY.

"Workplace Shell is fabulous. I'm constantly amazed at the number of powerful, easy to use features you've incorporated.... I also think your implementation of DOS and Windows is excellent. Both are fast, stable and complete. Windows applications work great and DOS applications definitely run better on OS/2 than on Windows.... I think IBM has got a winner here. 2.0 is fast, stable, flexible and easy to use. It runs great on my 1988 16 MHz clone despite the old BIOS. And you've incorporated a lot of good customer suggestions. I'm definitely sold. Keep up the good work!"
MAYER BRYSON INVESTMENTS IN SAN FRANCISCO - ROBERT MAYER, PRESIDENT.

OS/2 OFFERS TRUE MULTITASKING.

"I've long looked for a way to integrate my workaday computing. OS/2 is the answer..... My day begins calling various on-line services via modem, opening numerous documents on my word processor, and starting a DOS-based database I use for my students grades. Before OS/2, this took quite a bit of time. But now I have these programs set to open on start-up, and my overall productivity has increased three-fold. I can answer a student's grade queries as I confidently print a lecture I must give, compile some utility I wrote in C++, down-load from the EEP BBS, all the while backing up the directory containing my book to a floppy disk---try that with DOS or Windows! ...

I'm not a Big Iron guy, just a dedicated theology teacher and scholar, but OS/2 is a God-send for my productivity and for the stability of my work environment--which is precious to me, if to no one else. OS/2 is man made, I know, and my jaded fellow theologians may find this heresy, but day by day OS/2 seems to me to be a flat-out miracle." SAINT JOSEPHS COLLEGE IN RENSSELAR, INDIANA - MARK JOHNSON, ASSISTANT PROFESSOR, DEPARTMENT OF PHILOSOPHY & RELIGION

OS/2 EXCELS WITH MULTIMEDIA.

Future developments in the Ultimedia (Multimedia) market prove the value of OS/2 as the most viable personal computer operating system to ever hit the market. The ability to use touch screen technology in conjunction with audio visual systems for the purpose of person-to-person communications in manufacturing and educational environments can only help America regain her economic leadership status..... IBM and OS/2 2.0 are America's best business partners and are helping to make our best resource, our people, more productive!" TITLEIST & FOOT JOY WORLDWIDE IN NEW BEDFORD, MA. - CARL S. NORMAN, SUPERVISOR, END USER SERVICES.

OS/2 IS THE NEXT GENERATION, TODAY.

"Compared to the dedicated single user software products that have become so popular under Windows, major new enterprise applications will all require an entirely new level of operating system support.... MultiThreading is a key OS/2 feature, and one that may impress more than a few individual users because it increases the performance of application software..... The most likeable feature of OS/2 2.0 for the individual user is the ability to keep what that user has now (DOS with Windows) while adding some new benefits, such as performance, and the ability to try some new OS/2 specific software. Gain without taking a loss... 'Easy to accept.

OS/2 is really a new generation operating system that goes far beyond DOS. It is like the automobile compared to the horse and buggy. They both get you there, but can you really compare them? Although when the automobile first came out there were no interstate highways, there are today. And we all know the value of

the automobile. OS/2 (and Extended Services) is the computing equivalent of the automobile (and interstate highway). We can't live without it, but that vision has not occurred to everyone."
CITIBANK (PRIVATE BANK DIVISION) IN VALHALLA, NY - DAVID H. JANSON

WHAT THE PRESS IS SAYING ABOUT OS/2

OS/2 SUPPORTS LOTS OF APPLICATIONS.

"OS/2 2.0 runs Windows, DOS, and OS/2 desktop programs, all from the OS/2 desktop as promised ... That is no small feat, and IBM is to be commended for making it all work." NICHOLAS PETRELEY, INFOWORLD, APRIL 6, 1992.

"The things I've been told by the Microsoft people simply don't wash. This version of OS/2 is one nice piece of code. It runs Windows 3.0 better than Windows 3.0 itself and runs DOS better than DOS, for sure. And you don't need to spend a fortune on DOS extenders and memory managers. They're built in as they should be. All it doesn't do is run Windows 3.1, but so what? Version 3.1 is a bug-fix and performance upgrade with compatibility problems." JOHN C. DVORAK, PC MAGAZINE, AUGUST 1992.

"Its {OS/2's} ability to run multiple DOS applications well easily exceeds that of Windows 3.1 It generally runs Windows applications as well as -- and, at least in some cases, significantly better than -- Windows 3.1 does." WILLIAM F. ZACHMANN, PC WEEK, MARCH 30, 1992.

"I think IBM has done a terrific job at delivering a solid, superior operating system. ...they are riding high and their ISV program is run well and incredibly helpful." PATRICIA ZULLO, SALES MANAGER, SOFTWARE CORP. OF AMERICA, STAMFORD, CT, APRIL 6, 1992.

"Software Vendors are already scrambling to get on the OS/2 bandwagon." WILLIAM F. ZACHMANN, PC WEEK, APRIL 20, 1992.

OS/2 IS SUPERIOR TECHNOLOGY.

"Technically all the experts agree that OS/2 has a more advanced, more powerful foundation than Windows ... And it offers real memory protection." PHILLIP ROBINSON, THE BOSTON GLOBE, MAY 12, 1992.

"OS/2 claims to be a 'better Windows than Windows,' ...the claim is justified... Using a technique called preemptive multitasking OS/2 allows the user to operate several different software applications at once ...it pays off in higher performance for the user." PETER LEWIS, THE NEW YORK TIMES, APRIL 26, 1992.

"Overlooked in the media war between OS/2 and Windows 3.1, some analysts say IBM's OS/2 network add-ons - along with an army of

developer support - could make it the favored enterprise operating system over Microsoft's Windows NT."

VANCE MCCARTHY, INFOWORLD, APRIL 13, 1992.

"IBM appears to be about six months to a year ahead of Microsoft in terms of getting an object oriented foundation into system software, industry developers agree. ...it's the basis for all the ruckus going on over at Microsoft."

WENDY GOLDMAN ROHM, COMPUTER RESELLER NEWS, MAY 18, 1992.

"I was reluctant to move to OS/2 2.0, but now I can't imagine using anything else. If you have the horses, you're crazy not to try it, folks, no matter what they say. It takes 55 minutes to install, and if your hardware can handle it, the software is rock solid, just like the OS/2 nutballs say it is... It's not particularly fun to tell these guys that they were right." JOHN C. DVORAK, PC MAGAZINE, AUGUST 1992.

OS/2 IS POWERFUL.

"What's fascinating about OS/2 is its ability to run DOS programs up to three times as fast as DOS itself." JOHN C. DVORAK, PC MAGAZINE, AUGUST 1992.

"Software gurus all agree that the product (OS/2 2.0) is impressive both in performance and features... Compared with other environments, OS/2 offers significant performance increases..." WENDY GOLDMAN ROHM, COMPUTER RESELLER NEWS, APRIL 6, 1992.

"Underpowered and outgunned, troubled by problems, Windows 3.1 lacks the firepower needed to win the OS War of 1992. ...It is OS/2 that generates enthusiasm among buyers." WILLIAM ZACHMANN, PC WEEK, MAY 11, 1992.

WHAT MICROSOFT IS SAYING ABOUT OS/2

In advertisements, "white papers" and public forums, Microsoft has become very aggressive in promoting their products and placing their competitors' products in a bad light. This section will highlight some common myths advanced by Microsoft about OS/2 and provide alternative points of view.

MYTH #1: OS/2 HAS FEWER APPLICATIONS THAN WINDOWS.

Yes, there are more native Windows applications than native OS/2 applications, but the point is that (in total) OS/2 supports MORE applications. Although Microsoft claims that there are over 4,500 Windows applications in the market, the majority of application sales are still DOS applications. OS/2 2.0 supports the Windows applications plus more of the 25,000+ DOS applications than Windows can run. It also supports the OS/2 applications (2,500+ 16-bit, and 1,000+ 32-bit by year

end), and with TCP/IP, it supports the UNIX applications through X-Windows. The fact that there aren't as many NATIVE OS/2 applications only means that OS/2 will get better and better as time goes on. Because with OS/2, users have MORE to choose from, not less.

- o When it comes to Windows, IBM warmly embraces Windows APPLICATIONS (note the emphasis); they happen to run better under OS/2 along with the many DOS and OS/2 applications. We want the Windows crowd to feel right at home with OS/2 and have created an ideal place for DOS and Windows -- on the OS/2 desktop.
- o Microsoft has implied that OS/2 2.0 is not compatible with many Windows applications such as ones written for version 3.1 and will not be able to add 3.1 support because of licensing issues. In reality, IBM does have rights to Windows 3.1 source code, and IBM demonstrated it's ability to support 3.1 just hours after Microsoft delivered it to the public.
- o When a vendor ships new software, minor incompatibilities often accompany the new function. Windows 3.1, for example, has problems running dozens of Windows 3.0 applications, including Microsoft applications, and support for Windows 2.x applications has been removed entirely. The future (1993) NT operating system will run even less DOS and Windows applications than 3.1 does today, according to Microsoft, and neither version will run OS/2 graphical applications. OS/2 2.0, on the other hand, will run Windows 2.0 and 3.0 applications concurrently. It will also run nearly all of the 30+ Windows 3.0 applications that Microsoft warns will not run properly under windows 3.1 without upgrades or fixes:(2)
 - Ace Software AceFile
 - Adobe Illustrator
 - Adobe TypeAlign
 - Aldus FreeHand 3.0
 - Aldus Persuasion
 - Bitstream FaceLift 1.2
 - Borland C 3.0 WInsight
 - Campbell Services OnTime 1.0
 - Central Point Software PC Tools
 - Channel Computing Forest and Trees 2.0a
 - Claris Hollywood
 - Coda Finale
 - Computer Support Arts & Letters
 - Software Publishing Harvard Graphics for Windows
 - Computer Support Picture Wizard
 - First Byte Monologue for Windows
 - hDC First Apps Memory Viewer 1.0
 - Hewlett-Packard NewWave
 - Lotus Ami Pro
 - Microsoft Bookshelf for Windows
 - Microsoft PowerPoint 2.0e
 - Microsoft Productivity Pack 1.0
 - Microsoft Word for Windows 1.1
 - PowerSoft Powerbuilder 1.0
 - SofNet FAXit for Windows
 - PFS:WindowsWorks
 - NBI Legacy
 - Norton Desktop 1.0

MYTH #2: OS/2 COSTS MORE THAN WINDOWS.

The implication is that OS/2 requires more expensive hardware to perform the same functions. An entry level user does indeed need more memory and disk space for OS/2 (see the comparison charts at the end of this paper), but OS/2 provides more function and the ability to run more applications. IBM might argue, "you get what you pay for", but there's much more. Here's a subset.

- o OS/2's purchase price is about half that of DOS plus Windows(3), and you get more: Adobe type fonts, REXX procedural language, etc.
- o OS/2's Workplace Shell is a new generation user interface that improves on early GUIs such as Microsoft Windows and OS/2 Presentation Manager. It has been referred to as the "GUI of the 90's", and its object orientation helps lessen education and support costs by making the system easier to use and more intuitive.
- o As a single operating environment to install, maintain and support, OS/2 can lower overall end user support costs. You can run your DOS and Windows applications without the need to purchase DOS or Windows.
- o The ability to install OS/2 across a LAN, distribute software remotely, and provide superior networking facilities also helps lower support costs.
- o Instead of installing OS/2 on the user's local hard drive, OS/2's support of Remote IPL lets users optionally boot from a network drive. This can help address concerns about disk space requirements and eases the task of making software changes. Remote IPL is even available for disk-less systems.

MYTH #3: OS/2 IS SLOWER THAN WINDOWS.

In recent PC Week advertisements, (4) Microsoft has shown benchmarks that suggest that OS/2 2.0 runs slower than Windows 3.1. They are encouraging people who bought IBM systems preloaded with OS/2 to "trade up to DOS and Windows." Isn't that a step backwards?

- o IBM's own benchmarks confirm that loading and running single Windows applications can be slower under OS/2, but in a multi-tasking environment the numbers turn around dramatically. IBM's tests were run by an independent testing firm (National Software Testing Laboratory) and were part of a two hour satellite broadcast on July 23, 1992. In one example, loading MS Word for Windows on a PS/2 Model 57 with nothing else running took 7.2 seconds with Windows 3.1 and 9.3 seconds with OS/2 2.0. If you do the same load with an XCOPY in the background, Windows load time jumps to 41.1 seconds, compared to 15.3 seconds for OS/2. Even more important than the performance numbers is the difference in "feel." The OS/2 system remained responsive and smooth, while the Windows 3.1 system made it almost impossible to use even the simplest text editors when other tasks ran in the background.

Contact your local IBM branch office to arrange to view a video recording of that broadcast and you'll see the truth about performance and how well OS/2 fares with DOS and Windows applications, and you'll become amazed at the potential of 32-bit applications that exploit OS/2.

- o The minimum configuration for OS/2 2.0 is 4MB. Systems with only 4MB of memory may be adequate for entry level users running a few simple DOS applications, but many users will find that 6-8MB of memory greatly improves performance and justifies the cost. This is especially true when running sophisticated Windows applications in separate virtual DOS machines and using OS/2's seamless windowing interface, as Microsoft did in their benchmarks.

Certain PS/2 models were preloaded with OS/2 and included the minimum 4MB of memory. These systems have recently been expanded to 8MB at no additional cost. This was partly because the number of customers running sophisticated new applications was more than anticipated.

- o OS/2's new Workplace Shell lets the computer work the way users work. With one mouse click, users can do what would have taken almost a dozen steps with Windows or OS/2 1.3. Of course, if you want to do things the old slow way you can, and that may be what Microsoft did in their testing.

MYTH #4: OS/2 IS COMPLEX.

Which is more complex, an Infiniti or a kit car built on a Volkswagen chassis? IBM has used sophisticated new technology to make OS/2 easy to install and a dream to drive.

- o OS/2 eliminates much of the complexity involved with memory extenders, terminate and stay resident programs, and the task of integrating pieces of an operating environment that is associated with the DOS and DOS+Windows world. This is especially true in an enterprise environment that requires connectivity to different systems and database support.
- o OS/2's Workplace Shell is an object-oriented user interface (OOUI) that is more productive and easier to pick up for first time users. In addition, once the basic principles are learned, even experienced users of old GUIs like Windows find they prefer the Workplace Shell, since more complex tasks can be accomplished easier and with more flexibility.
- o OS/2 offers pervasive context-sensitive helps using the latest hypertext techniques for easy answers to user's questions. It includes an impressive set of tutorials and useful mini-applications (applets) to get the new user familiar with the system and immediately productive.
- o Microsoft points to OS/2's DOS settings as an example of complexity, but Windows' method of assigning special settings to a DOS program via a Program Information File (PIF) is more cumbersome.
- o Installing more than 20 diskettes can seem complex at first, but

OS/2 does an admirable job of making it easy and of migrating existing applications. The installation process can even be accomplished across a local area network or eliminated entirely by choosing OS/2's remote IPL capability or purchasing new systems which are pre-loaded with OS/2.

MYTH #5: OS/2 IS DEAD END TECHNOLOGY, TO BE ECLIPSED BY WINDOWS NT.

Windows NT was initially positioned by Microsoft as a Server operating system that requires at least a 33MHZ 80386, 8MB as minimum memory and 100+MB of disk; but now they are saying that some stand-alone or client systems will use NT. Although early, pre-beta versions are already in the hands of some developers, NT won't be generally available until sometime in 1993.

- o OS/2 2.0 already provides most of the function that Microsoft plans to deliver in NT and does it on client systems. Comparing IBM's client system with a future server system is an interesting exercise but makes little sense.
- o If you want to compare server systems, compare the server systems that are available today. IBM's LAN, communications, and distributed database support is far more extensive than anything Microsoft offers today, and IBM's PS/2 Model 295 already includes a special version of OS/2 that supports multiprocessing, RAID-5 disk fault tolerance, and other features that Microsoft is saying will be important parts of NT's future.
- o If you want to compare futures, compare futures. Both IBM and Microsoft have described their plans to support
 - Symmetric Multiprocessing
 - Portability to other Platforms (eg. RISC)
 - Government C2 Security
 - Improved File Systems
 - Improved Object Technology
 - etc.
- o In examining available technologies, IBM decided that the proprietary nature of the Windows NT kernel was not appropriate for its customers and has opted instead to evolve OS/2 on its own, using the more-open MACH kernel from Carnegie-Mellon University. OS/2's 32-bit flat memory model already makes it fairly easy to port applications between mainframe, UNIX, Apple and OS/2 environments. But it's IBM's long term intention to mix technologies between OS/2, AIX, and Taligent (part of the IBM-Apple alliance) and to eventually merge them all into a single system that could run 32-bit OS/2 applications, UNIX applications and Apple applications concurrently on the same system, providing the best investment protection scenario. The message for developers is to focus on 32-bit applications, and OS/2 provides that environment today. Over 750 software vendors apparently agree and have promised over 1,000 32-bit OS/2-exploitive applications by year end.
- o OS/2 2.0 is already ahead of what we know of Microsoft NT in the area of object oriented programming. The High Performance File System (HPFS) provides for long file names and extended attributes

to support objects. Although Windows NT will include HPFS as well, it still has nothing that comes close to OS/2's object-oriented WorkPlace Shell, which is built on IBM's System Object Model (SOM). Microsoft has been hinting that their object-oriented future will hinge around a product code-named Cairo, which is not expected until at least 1994.

IBM's object-oriented development will not stop and wait for Microsoft to try to deliver a "better OS/2 than OS/2." SOM is being updated with technology from IBM and from Talligent to give OS/2 and AIX a standard way of writing class libraries that can be used by multiple languages and applications.

- o A recent IBM/Microsoft agreement has extended IBM's rights to Windows {3.1} source code. It also redefined royalties that IBM should pay Microsoft for using Windows code in OS/2. This paved the way for IBM to include Windows 3.1 support and to possibly offer future OS/2 versions that include no Microsoft code to eliminate royalty payments. IBM maintained the right to sell Windows/NT to customers who demand it but gave up the right to NT source code, opting instead to develop future OS/2 versions on its own. Microsoft paid a large, one-time sum to have access to a subset of IBM's patent library.
PAUL M. SHERER, PC WEEK, JUNE 29, 1992.
- o "We believe that neither of these (future) operating system environments (Win-32 or Windows NT) will offer the full library of application compatibility supported within OS/2 2.0. For example, it is doubtful if either WIN-32 or Windows NT will support OS/2 1.x, OS/2 2.0, or even Windows 2.x applications. These confinements should be worrisome to potential users and poses financial risk for MIS decision makers who will have to rewrite their applications to strictly conform to these new Microsoft operating systems."
WORKGROUP TECHNOLOGIES, INC.(CONSULTANT), JANUARY 29, 1992

FOOTNOTES:

1. "Now that I Have OS/2 2.0 on my Computer, What do I do Next..." a book by Steven Levenson and Eli E. Hertz, published by Van Nostrand Reinhold, available at bookstores and from IBM (form# G362-0008).
2. PC Week, March 23, 1992. The article says that these products were taken directly from the Win 3.1 on-line help system.
3. OS/2 2.0 = \$195, DOS 5.0 = \$165, and Windows 3.1 = \$149. These are suggested retail prices, and special promotions are common. The fact that many systems come pre-loaded with either DOS/Windows or OS/2 can make price of software a moot point.
4. PC Week, June 29, 1992, p.31.

Technical Comparison of Windows 3.1 and OS/2 2.0		
	WINDOWS 3.1	OS/2 2.0
PROCESSOR, REALISTIC MINIMUM	386SX+	386SX+
DASD, MINIMUM-FULL INSTALL	9-11+ MB	13-29 MB
LARGEST HARD DRIVE	1 GB	64 GB (HPFS)
LARGEST FILE SIZE	1 GB	2 GB
SCSI EXPLOITATION	No	Yes
SCB EXPLOITATION	No	Yes
PHYSICAL MEMORY LIMIT	> 16MB	> 16MB
VIRTUAL MEMORY LIMIT	4 x Physical	512MB, disk size
MEMORY MODEL	Segmented (64KB)	Flat-Mem.Objects
MULTITASKING DOS APPLICATIONS	Time slicing	Preemptive Time Slicing
MULTITASKING WINDOWS/PM APPLICATIONS	Cooperative	Preemptive Time Slicing
PRIORITY	Static, user sets	Dynamic
DISPATCHABILITY	Process	Thread
I/O AND SYSTEM SERVICES	Serial	Parallel/Overlap
PROTECTION BETWEEN APPS	Unprotected	Protected
KERNEL PROTECTION DOS APPLICATIONS	Unprotected	Protected
KERNEL PROTECTION WINDOWS/PM APPLICATIONS	Protected	Protected
FILE SYSTEM	FAT	Enhanced FAT HPFS Installable
RELIAB/AVAIL/SERVICE SUPPORT	None in 3.0 Dr.Watson in 3.1 MS Diagnostics	Stand Alone Dump Error Logging Trace Utilities
NOTE: The discussion regarding Windows is based upon information which the Microsoft Corporation has made publicly available and is subject to change.		

TABLE 2. COMPARISON OF DOS ENVIRONMENTS

Comparison of DOS Environments. (Typical for IBM Mod 80-071)						
	DOS 5.0	OS/2 1.	WINDOWS 3.0 ON DOS 5.0 REAL	DOS 5.0 STD. ENHANCED	OS/2 2.	
MEMORY with EMS & Mouse	623KB 601KB	529KB	558KB	571KB	569KB	633KB
MEMORY W/3270	522KB	495KB	486KB	492KB	541KB	633KB
MEMORY W/ LAN PCLP Requester	543KB	486KB	386KB	391KB	441KB	633KB
SYS. INTEGRITY	Low	Low	Low	Low	Medium	High
EXTENDED MEMORY (XMS)	16MB	None	16MB (Total)	16MB (Total)	16MB (Total)	32MB Per App
EMS 4.0 MEMORY	16MB	None	16MB (Total)	None	16MB (Total)	32MB Per App
PHYS. DOS RAM	0-1MB	0-640MB	0-1MB	0-1MB	Paged	Paged
MEM.OVERCOMMIT	None Switch	None Switch	None Switch	None Swap	4 x RAM	Avail DASD
SWAP FILE	File System	File System	File System	File System	File Sys.or Physical	File System
# OF DOS APPS	16	One	16	16	16	> 32
BACKGROUND EXEC	No	No	No	No	Yes	Yes
INVOCATION	Shell/Cmd	Icon	Icon	Icon	Icon	Icon
WINDOWED	No	No	No	No	Yes	Yes+
CUT & PASTE	No	No	Yes	Yes	Yes	Yes
PRINT SPOOLING	Yes	Yes	No	No	No	Yes
INST.FILE SYS.	No	Yes	No	No	No	Yes
DIRECT H/W	Yes	Yes	Yes	Yes	Yes	Yes
TIMING DEPEND. APPS.	Fgd.	Fgd.	Fgd.	Fgd.	Exclu- sive	Fgd. or BG
DPMI EXTENDER	No	No	No	No	Yes	Yes
VCPI	Yes	No	No	No	No	No
CONTINUES AFTER SERIOUS APP ERR	Rarely	Rarely	Rarely	Rarely	ometime	Usually

NOTE:

The discussion regarding Windows is based upon information which the Microsoft Corporation has made publically available and is subject to change.

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