To: SteveB, BillG   date: 3/5/91

cc: Bobmu, Bradsi, Jimall, Carls, Yarons, Russw

From: Paul Maritz

Subject: NT, OS/2, AND OTHER ISSUES

Attached are four related memo's:

A.   OS/2 SUPPORT APPROACHES AND OPTIONS
       B.   PROPOSAL TO IMPLEMENT POW/NT
       C.   NT PRODUCT RELEASES - PHASING AND POSITIONING
       D.   IMPLEMENTING OS/2 & PM APPLICATIONS ON NT - BACKGROUND

They are background for a meeting that we have scheduled on March 15th. They cover
           respectively the options and issues for supporting OS/2 applications and customers
           as we go forward on our "windows-centric" strategy, options to get what needs be done,
           in what time-frames we could get them done, and how that affects our positioning of
           various products and releases, and a previous memo for some high-level technical
           background.

Russw, Bradsi, Jimall, Carls - you only need read section C (page 14),
           rest is optional.

A. OS/2 SUPPORT APPROACHES AND OPTIONS:

This memo is some background on my thinking on what we can do to support
           OS/2 (including PM), as we move forward on our Windows-centric strategy.

I.   Bottomline:

                   There is unfortunately no "low cost" middle ground. Either:
                   (a)   We have to build a long-term plan that allows a reasonable
                           subset of PM-16 and PM-32 applications to run in a reasonably
                           integrated way on NT.
                   (b)   Or we have to publicly advise all customers to make the
                           switch from PM to Windows API's as soon as possible, and
                           explicitly repudiate PM by saying that MS has no plans for it
                           beyond OS/2 2.0.

                   Unfortunately the alternatives such as PMLO, WLO-32, etc either do
                   not really meet the needs of the key audience (customers who have
                   invested in PM), or take long enough to do that they are not really
                   worth pursuing.

                   I recommend that we do (a) above, and the issue becomes how to get it
                   done and in what timeframe. Below I consider the alternatives and
                   build up to the conclusion above, and then consider how to get things
                   done.

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II.   Who is the audience?

It is important to ask who is the audience for OS/2:
- the corporate customers with an existing commitment to the PM APIs,
- the ISVs,
- or IBM?

They are all important, so we must look at their respective views:

a.   The ISV's

For those that have invested in Windows, they are basically fine - they can use WLO if they need to target OS/2. The only issue for these ISVs, is MS getting Win32 on Win4 and NT done in a timely fashion.

For those that have invested in PM first, they can and will switch to Windows. So ISVs are not a major consideration.

b.   The corporate customers who have invested in OS/2 & PM application development:

These would include people like Boeing, Liberty Mutual, Royal Bank of Canada, Commonwealth Bank, Goldman Sachs, etc.

These people believe they bought into OS/2 PM as an architecture because they wanted: .
- an "industrial strength OS" ("one with lots of memory, real multi-tasking, and connectivity") which would have popular industry support,
- AND in most cases because they were influenced by IBM.

Neither of these influences is going to go away:
- They perceive Windows 3.0 as a "step backwards" in the sense that the reason they went out on a limb and became an early OS/2 & PM adopter, was because they believed they needed an OS with "a real OS with real multi-tasking and lots of memory".
- They have, to varying degrees, invested time & effort in rolling out and installing OS/2 based systems, and do not want to have to eat that investment in the near-term.
- IBM is still in the accounts pitching OS/2 as "industrial strength now, and getting better with OS/2 2.0", .
- Finally there is the "EE" component for some of these accounts (Royal bank, US Post Office, CIA, etc.). Whatever path forward is offered for these folk, EE has to be taken into account.

Thus we could possibly offer the following "products" to these accounts:

1.   PMLW - a OS/2 & PM-16 layer for Windows 3.x:

This is the idea of an OS/2 16bit layer on Windows
3.x. It would use some aspects of the current
"davidw" OS/2 16bit base mapping layer, and a
"Holeport" to map down onto the Windows GDI/User
(basically it would include most of PM sitting on
top/along side Win GDI/User).

I think this approach has several severe drawbacks:
-       the PM part is hard to do - would take us at
        least 18-24 months to do (ie. it would ship
        in 1993). This would mean that if it is done
        at all it should be done with Win4 and/or NT
        in mind.
-       I don't think the majority of customers would
        want it - it would be perceived as either a
        step backward ("not real multitasking etc"),
        a perception which would be reinforced by
        IBM. If they are to switch at all, they would
        probably start looking at other here/now
        solutions (ie. some variant of UNIX). This is
        the Boeing/Goldman Sachs reaction, for
        instance.
-       It does not address any of the EE customers -
        as this would certainly not host EE.

The real value of PMLW would have been as a migration
path for ISVs IFF our path was a PM-centric path
(which was the prevailing strategy when we last
looked at this in the Dick Hanrahan era). It has
limited appeal to the kind of corporate account that
has committed as an early adopter of OS/2. Given the
timeframes in which we could get it done, it is not
worth doing.

2.   OS2BLW:

This is a subset of the above - the "davidw"
libraries that map the base OS/2 API's and VIO API's.
Unfortunately these don't help most of the corporate
customers (no PM support). It probably actually helps
ISVs most who had VIO apps, but ISVs are not our
problem. It would not however benefit server ISVs as
DOS/Windows 3.0 cannot function as a server.

3.   WLO-32:

This would allow Win-32 programs to run on OS/2 2.0.
More likely it would allow some subset of Win32
programs to run - how large the subset would be would
be dependent upon what functionality we could get IBM

to put in PM on OS/2 2.0. They would definitely be
some loss of functionality though - eg. input queuing
would not be de-synchronized which could lead to some
problems as Win32 apps will be written to the async.
model. Other issues would be:
-        GDI enhancements (eg. correlations)
-        Unicode

Again this would be a substantial amount of effort,
certainly in the "24 month" elapsed time range. These
"mapping layers" are hard to do - the "devil is in
the details". It would have to lag the development of
the NT Win32 code as we would be pulling sections out
of that code body to do this. Development would have
to be coordinated with OS/2 2.0 PM enhancements.

How would the customers view this?

-        It would probably not change the view much of
         what they are doing today -ie. given the
         timeframes for WLO-32, they would still be
         basically confronted with a choice of using
         Win-16 today (either on Windows or OS/2 with
         WLO-16) or PM-16.

         If they elect to make switch to WLO-16 -
         fine, but if they elect to continue
         developing and deploying their PM based apps,
         then the major benefits of WLO-32 on OS/2 2.0
         that would accrue are:
         -        they still have to convert from PM to
                  Win-32 API's, but do not have to
                  switch out their operating system to
                  do this. The major benefit here is
                  probably that they can continue to
                  get access to EE support.
         -        they can (maybe) get access to ISV
                  developed Win32 applications - this
                  will depend on how many restrictions
                  WLO-32 imposes on an ISV, and our
                  success in evangelizing it. If OS/2
                  sales remain low, it will be
                  increasingly tough to persuade ISVs
                  to consider it worthwhile.

The net is that I consider this from a customer
perspective to be inadequate, mainly for timing
reasons - it would be done too late.

4.   OS/2 & PM support on NT/Win32 ("POW/NT"):

The idea here is to run OS/2 PM applications under NT
via subsystem extensions. There are four incremental

levels of support:

(i)   OS/2 32bit Base calls:
This is not a lot of work - probably approx 2
additional man-years of development given
what we have now, and could get done in the
1992 timeframe.

(ii)   OS/2 32bit Base & PM calls in separate screen
group:
This is a substantial amount of work, but
given that IBM does not make major
"enhancements" to the PM API's, this could be
done with approx. 20 man years of work, and
could get done in the "later 1993" timeframe.
It would leverage fair amounts of work
already done. Note that there would still be
restrictions on these applications to be
"clean" - ie. no OS/2 2.0 device driver
dependencies, etc.

(iii)   OS/2 32 Base & PM calls and "clean" OS/2 Base
and PM 16bit applications - still in separate
screen group:
Provided we place some restrictions on 16bit
OS/2 apps (no mixed 16/32 bit code, no ring 2
code, etc.), we could probably support these
applications with a "modest" additional
effort and in same general timeframe.

(iv)   As above, but sharing the same screen group:
This would allow OS/2 PM applications to run
in a window and allow for much more seamless
integration between Win16, Win 32
applications and OS/2 applications on NT.
However this would require substantial
additional work. How much is not clear, but I
intend to charter some work to think this
through.

In essence these four steps amount to "PMLW" for NT/Win32 - a little
more detail is given in a previous memo (attached).

What would customers think? The pro's/con's are:
Pro:
This would definitely protect that customers
investment best in the long term - they can:
-     move both their applications and the
users forward to the ultimate
technology base (NT) with its
benefits (ISV support, security,
etc.), without large re-engineering
of the applications.
-     continue to deploy in the interim on

OS/2 1.x and 2.x.
- provided IBM ports EE in the same general timeframe, they can continue to use EE services.

Con:

- to be really meaningful, one has to ultimately do all "four" levels of support for OS/2 apps on NT (base, PM 16 & 32, share same screen groups) it is likely to be relatively far out in time ("'94" ?). This means that customers who have committed to OS/2 & PM, may have to rely on WLO-16 to get access to mainstream ISV work for some time.
- If IBM elects not to port EE to NT, then EE customers are still handicapped.

5.   Migration Tools from OS/2 & PM 16 bit to Win32:

This a potentially useful solution in that our real problem is corporate developed applications, rather than ISV developed applications (ISVs will cover both Win and PM). However, it is not clear that a tool can ever be more than an aid in conversion - it cannot be done automatically. Thus a corporate developer would have to do significant work to get his app up and running under Win32, they will not be able to keep running older PM applications. This is not a strong story to tell - and will not be received as an adequate solution by the likes of Boeing (for instance).

On the other hand, independent of what else we will be doing, some people will elect to switch from PM to Win interfaces and we should endeavour to support them with tools.

c.   IBM

What will IBM want? This analysis presumes that IBM remains on a PM-centric strategy.

IBM believes that the PM-32 interfaces are their strategic interfaces, and wants to promote them.

Of the above "product" options, IBM will most likely react as follows:

1.   PMLW:

While they would be in favour of this, they would not
be that interested because:
- it would support the PM-16 interfaces
  (although I guess we could "thunk" in the
  PM32 interfaces),
- it would take too long to get done,
- it would not run EE.

3.   WLO-32:

They would be in favour of this in that it would help
them promote OS/2 2.0 in advance of NT, but again the
timeframe in which it could get done would lend them
to consider it insufficient.

4.   POW/NT:

They would be in favour of this, but only if we
committed to do all four levels (commit to support
16bit apps and run "integrated" in same screen
group).

The timeframes would probably "scare" IBM less than
it does us - given that they do not see NT being a
factor before 1993 - much beyond that though would
probably concern them. They may have some concern as
to which is the "primary" environment - Windows or
PM. In our view it is clearly Win that is ,
pre-eminent, and the PM support gets spliced in.

Migration Tools:
IBM will not be in favour of these, as they see the migration as going the
other way. Only if succeed in convincing them that Windows should be
the strategic API, will they look on these tools with favour.

In general, IBM's major issue is/will be their general
mistrust of our commitment to "OS/2 & PM". Clearly they are
staffing their "insurance plans" - such as the PM port to AIX
that Hursely is doing.

RECOMMENDATION:

(1)   We need to build a development plan to "POW/NT", and to plan on
       over time doing all four levels. This will take 2-3 years to
       complete. In the interim we should start deciding what
       "restrictions" we need to place on OS/2 16- and 32-bit
       applications to enable them to port directly to NT, and to
       communicate this to corporations.

(2)   We should research and fund tools to aid in the conversion of
       OS/2 & PM apps to Win api's.

Our options for doing so are considered below.

II.   How ?

a.   POW/NT:

We have two basic options:

(i)   Get IBM to do it.

They are the ones with the "strategic" interest in
PM API, will be extending it, and are maintaining a
continuing investment in PM expertise.

To do so, we would still have to work cooperatively
with them, as we would have to agree on the "hooks"
or interfaces that would be needed to splice in the
"PM" support in our Win32 server on NT.

The downside is that it would mean that we would have
to renegotiate our contracts with them (as we would
want access to the work they do) and maybe have to
forgo the monies owed to us for doing this work.

(ii)   Build a "new" team at MS to do it.

Basically most of the expertise at MS that can do this
work has been re-focussed onto implementing Windows
on NT, and/or Windows 4 on DOS. These are the higher
priority projects and these people are likely to be
tied up on these projects through the better part of
92, and probably 93.

So the problem becomes that of how to build
essentially a new team of people to do this, and
above all motivate them.

The proposal that I have on this is fairly
unorthodox, but it is the best that I have so far. I
will consider it in a separate memo.

(iii)   Use outside help

There are not too many outside firms that know OS/2 and/or PM.
However, there is the possibility of using Citrix (the Boca spin-off)
to do the "base" - DOScalls, VIO/KBD - work. They need this work
to help transition their customers to NT, they have the expertise (any
one who was good at Boca is at Citrix) and the hunger.

b.   Conversion Tools:

I believe that we should dedicate a program manager to
researching and contracting out tools that can be of use. I
will work with Bobmu to implement this.

B. PROPOSAL TO IMPLEMENT POW/NT:

As noted in my other memo, if we make the decision (as I propose we do) that
           MS is to implement this support, the hard thing is getting it done.

What makes it hard is that we have re-deployed our PM expertize onto other
           projects: Scottlu, Chuckwh & company are working on the Win32 subsystem for
           NT, Nielk is working on AFX, Bens & company are working on Win4, Stevewo is
           working on NT itself etc. Given our "Windows-centric" strategy is makes sense
           to have these folk so deployed, quite apart from the difficulty of persuading
           them to come back and work on PM. The residual expertise that we have in the
           PM area is on the "WLO" team, so it is possible that we can pull some folk
           from there - but there too there is a general feeling that people want to
           move on and work on something "new". We are going to have a hard time
           motivating people to continue working on OS/2 related topics when it is not
           viewed as being at the centre of the companies strategy.

Thus in an effort to think though how we can get this work done, I have come
           up with the following:

1.   OS/2 Base Support:

I have opened discussion with Ed Iacobucci at Citrix. We have briefed
him on our strategy and NT. He loves NT, and is a proponent of moving
their multi-user subsystem to NT. They have approx. 20 developers
from the IBM Boca lab and know the OS/2 Base system very well. They
have actually done a pretty reasonable job of turning OS/2 1.21 into
a multi-user system - they've re-implemented the session manager,
re-implemented parts of VIO/KBD, integrated security into the system.
The result is that they are selling what they position as a
"multi-user DOS-like system" (as opposed to UNIX like) that installs
from 4 diskettes, and on a 486/33 with 12MB RAM can comfortably
support 32-64 users. They believe that they have to go to OS/2 2.0 to
get MVDM support (they will not use any other features), but beyond
that Ed wants them to move to NT asap.

Ed would like to (i) work with us to get the support they need to
allow their customers to migrate to NT, (ii) do some of the work if
that is appropriate.

I believe the only issue here would be $'s. Citrix will run out of
cash in June, and will need to have us finance their work either
directly or indirectly. Given their natural desire to avoid further
dilution, we can probably drive a reasonable deal with them - and
still have the option to take some of the company if we chose.
Bobkr is doing some basic due diligence on the business side of
them.

I believe (not substantiated by a detailed plan) that if we worked with Citrix we could get an 16bit (restricted) & 32bit Base Subsystem out on NT in 1992.

A further benefit is that Citrix will want to sell NT as a packaged product (as they do OS/2 1.21 today!), and will work with us to get good device coverage.

2. PM Support:

This is the hard one. We have to build this expertise ourselves.

The proposal I have is to utilize a core of the ex-patriate Israeli contingent we have here (Yarons, Avin, and possibly others: eg. Gilado, Yuvaln), and who want to return to Israel. Yarons has knowledge of OS/2, and Avin has been the leading figure on WLO where he has developed a good overview of the problems of splicing Windows in PM and actually making it work.

The idea is to form a core of capable people who are motivated to do the work and let them take on the project. The core (3-4 persons) would start the work here in Redmond, and then move it back to Israel, adding another 6-7 in Israel to build up to a team of 10-12 people.

Benefits of this approach:

(i)   It is a way to build a core of good people who are motivated to get the work done, and will not feel like "second class citizens".

(ii) Israel has a surplus of qualified people that can form a long term asset to the company. Other U.S. companies (Intel, Motorola, DEC, National Semi, IBM) have been successful at building R&D centres there. Soviet emigration is dramatically increasing the pool of numerically literate persons.

(iii) While the long-term costs of employing a developer there are roughly the same as the U.S. (we forget that the U.S. has become a relatively "low wage" economy for developed countries), the Israeli government and/or other foundations will offset 40-60% of costs for the first several years.

(iv) Good people - the experience at Intel and other companies is that the Israeli's are generally rated higher than average. This is mainly because companies can be more selective in hiring, but also because the Israeli recruits tend have had broader experience (eg. most of then have spent several years in the military). The education system is also generally good.

(v)   Good communications infrastructure - it is practical to rent dedicated 56KB and 1MB lines.

(vi)   The best way to start a remote development presence is to first form a core team that knows the parent culture, has a clear mission, and then let them run their own day/day activities. We are in a position to do this.

Downsides:

(i)   Remote development is never as easy on being on-site.

(ii)   Although we could build a good team, we will be building a new team (adds to time) - but I believe that we have to do this whatever we do if we are to do it at all.

(iii)   Do we want to have a long-term presence in that part of the world? While Israel is not a substitute for a European development centre in terms of political points, I am confident that it would be a long-term asset to the company. What about SCUD missiles, etc? This is hard to quantify, and certainly we should not put all of our marbles into the basket, but other companies (eg. Intel) have certainly considered it to be a good move for them.

If we decide to proceed on this tack, then the next steps would be to:
-       form the core team, and get started here in Redmond (I have had Yarons and Avin doing preliminary work - they will present on 3/15).
-       get help from MS Intl Legal/Finance and contact Israeli government to get set in Israel. Get best deal we can on subsidies, etc.
-       get authorization to start initial recruiting in Israel to augment core team so that we can hit the ground there running in the fall.

C. NT PRODUCT RELEASES - PHASING AND POSITIONING

Below is what I think to be possible/desirable as we phase NT into our product line.

I.   PRODUCT RELEASES

        1.   NT Product 1

                Timeframe: Mid'92 delivery

This product has the following basic functionality:
- Win 3.1 compatible UI
- Win32 API
- LM 2.x client and server support
- runs on MIPS h/w (MS and probably Compaq if they are different), and on Compaq 486 systems.
- we are shooting to support DOS/Win16 applications, but this is currently not firm as we have not closed schedules.

This system will NOT:
- support OS/2 applications - either base or PM.
- it will have the POSIX API, but not a general UNIX environment.

The net is that this system will have a couple of roles:
- establish our presence on the MIPS platform
- serve as a Win32 development platform.

In the absence of Win32 applications and DOS/Win16 support one might ask why ship this release. I believe it is important to do so for the following reason. Given that one of our greatest exposures right now is that people conclude that OS/2 is too confused, and Windows not robust enough, and thus decide to go to some form of UNIX - I believe that it is critical that we get a stable, robust development platform for Win32 out as soon as possible. In a certain sense one could claim that we should view the above release as simply the next in a series of "developers kits", however I believe for internal and external reasons we should position it as a product. It motivates us internally to achieve higher quality, and our "competition" (SCO/ODT) will be calling their release a product - even though they will be in a similar position. However we may very well position NT Product 1 as a release for "corporate developers" to enable then to develop, test, deploy on limited set of h/w, and generally get ready for Win4. We can sell it to those who would otherwise go to UNIX. For this reason I would probably make NT Product 1 available on both MIPS and "486" systems.

The challenge will be to keep this release focussed and unambitious, so that we can get it done and do the next release six months later.

What will we call this release? In particular, what will we announce on April 9th at the Gibraltar announcement? I delay this question for later - we need to look at the other steps first.

2.   NT Product 2:

Timeframe: Late'92, early'93

The basic function of this release would be to:

- sync up with Windows 4
- sync up with LM 3.0 (indeed, per jimall, parts of LM 3.0 may well become part of the product, as we move away from the current NBU model)
- include DOS/Win16 support if not there already
- provide the platform coverage necessary for replacing OS/2 1.3, 2.0 as our primary distributed system/server.
- I also postulate that we could include OS/2 base 16&32 bit support, but not yet PM support in this timeframe.

3.   NT Product 3:

Timeframe: Late'93, early 94

I postulate that this would be the release in which we can pick up PM support, ie. this would be the release that we call OS/2 3.0.

This may/may not be the release in which we also sync up with "Windows 5" (IAYF).

We could probably also in this time, have arranged to have a reasonable quality UNIX environment available on NT - best candidate to do this is OSF itself.

II.   NAMING AND POSITIONING:

Thus a summary of our likely product releases is as follows:

Product	Timeframe	Possible Positioning(s)
Win 3.1	Q3'91	Better Windows 3.0
NT Prod 1	Q2'92	(i) Windows on MIPS (ii) Development platform for people who need industrial strength Windows "now"
Win 4.0	Q1'93	(i) The "universal client" or "Windows for networks" - ie. still be the corporate

		mass market desktop OS.
		(ii) maybe, IAYF "release 1"
		(ie. some IAYF like features)
NT Product 2	Q1'93	(i) Windows for RISC and MP,
		(ii) Secure Windows
		(iii) Windows for Servers and Server Apps
		(iv) Distributed Windows
Win 4.1/5.0	Q1'94	IAYF Windows?
NT Product 3	Q1'94	(i) Windows for RISC and MP
		(ii) Distributed Windows
		(iii) OS/2 3.0?
		(iv) Mother of all OS's:
		- Windows
		- OS/2
		- UNIX

How should we announce and name things then?

The basic issue is should we have a fourth name apart from plain
"DOS", "Windows, and "OS/2". The candidates for the fourth name being
either "Advanced Windows", "NT/Windows", "MIPS/Windows",
"Distributed/Windows", etc.

If one accepts the above roll-out schedule, then one has to have a
fourth name for things NT, as whatever we could call "OS/2 3.0" and not have IBM
flatly repudiate it, is too far out in time.

The pro's/con's of the various names are:

"Advanced Windows":
>   Pro: -   sexy, hi-tech sound, positions it as a "UNIX
>   competitor".
>
>   Con: -   "Well in what way is it advanced, that
>   Windows 3.0 is not, and Windows 4.0 will not
>   be".
>   -   also more threatening to OS/2.

"NT/Windows":
>   Pro: -   complements DOS/Windows, helps describe what
>   it is.
>   -   "NT" is starting to build its own "identity"
>   -   allows for other "NT" positionings - eg.
>   NT/UNIX, NT/OS2
>   -   doesn't denigrate regular Windows as "not

being advanced"

- maybe slightly less threatening to OS/2 - we can claim that it merely describes technology that we are using, which will also be used to benefit OS/2.

Con: - NT by itself doesn't have broad meaning, identity - introduces another concept.

"MIPS/Windows":

Pro: - ties it directly to particular h/w platform - easy to position, leaves regular Windows and OS/2 more or less alone.

Con: - ties it directly to the MIPS platform, what would we call NT when shipped on x86?

"Distributed Windows"

Pro: - sexy, high tech.
- establishes long term "distributed" identity for NT

Con: - for initial releases "how is it distributed?"
- "you mean Windows in not distributed?"
- everything is "distributed" these days.

On balance, I recommend we use NT/Windows.

III.   GIBRALTAR ANNOUNCEMENT:

I recommend that we thus make the following announcement with DEC, Compaq, SCO, MIPS on 4/9:

"Microsoft will be providing NT/Windows for the standard MIPS platform.

NT/Windows is full 32bit, portable implementation of the Windows environment, with such advanced features as security, multi-threading, pre-emptive multi-tasking, high-performance and robust I/O, and multiprocessor support.

NT/Windows is the first product from Microsoft to use the NT operating system foundation technology. Microsoft expects the NT technology to be used in future products, including OS/3 version 3.0 the version of OS/2 which will enable both Window application programs and OS/2 application programsto be run.

It is our expectation that a customer purchasing NT/Windows will be able to upgrade to OS/2 3.0, and preserve all his investment. Similarly a customer upgrading from OS/2 2.0, will be able to preserve his applications investment.

NT/Windows is the first product that will implement the 32bit version

of the Windows application programming interfaces. These interfaces have been designed to inherit the wealth of software being developed under the current version of Windows, and allow this investment to be leveraged forward to new capabilities - including all the capabilities needed to build robust client -server applications."

Sample Questions:

(1)   Where is IBM?

This is a MIPS-based announcement, and MS believes that the MIPS architecture, by virtue of its support from companies like DEC and Compaq, will play an important role in the PC industry. IBM has a different RISC strategy. You should direct your question to them.

(2)   Isn't this open war with IBM?

MS believes that we are in the business of providing industry standard operating system on open h/w platforms - this platform meets that test. IBM understands this.

(3)   Why did you elect to first implement the Windows API's and not the PM API's?

The ISVs have voted with their feet - application programs are getting written to the Windows API's, we have to provide ISVs a way to leverage their investment - this announcement is an example of MS responding to that need. However our intention is to offer customers of NT/Windows the ability to upgrade to OS/2 3.0. Similarly, we expect OS/2 1.x and 2.x customers to upgrade to OS/2 3.0.

(4)   Will you make NT/Windows available on the x86?

Yes, but targetted as a "developer's release".
It will initially appeal mainly to corporate developers who wish to avail themselves of the WIn32 API environment. We do not expect it to surplant DOS/Windows either in the short or the medium term. It will complement it.

(5)   Why OS/2 then?

Microsoft realizes the reality that there are customers with strategic commitments to both the Windows and the OS/2 environments. It is our goal to put no technical barriers in the path of either of these customer sets, and to ultimately unite them both using the NT technology.

In the meantime there are compelling reason for customers to support OS/2 toady - it is the platform that carries the SAA API's, and it is the platform on which MS and others are

building up the largest repetoire of server applications in
. the industry. The applications will come over onto the NT
base.

(6)   If MIPS, then why not SPARC?

Although our operating systems technology is now portable, MS
is not in the business for porting for porting's sake. The
MIPS platform is one which is supported by two key partners
of MS - Compaq and DEC, who have chosen to develope a
platform standard that makes it easy for us to port our s/w
to, and which is based on an excellent processor technology
from MIPS. For these reasons, we believe it will be
successful, and we need to be there to all our corporate
customers to have an easy migration path if they need this
technology. Currently we do not see a compelling market need
to port to the SPARC - however, if we do see one then we will
support the SPARC.

(7)   Is this the first nail in coffin of the 386?

No, we have every reason to believe that Intel will ensure
that the x86 will remain competitive across the
price/performance range for most users. They have unsurpassed
semi-conductor technology and will use it to keep the x86
competitive.

(8)   Well, why put WIndows on any RISC processor at all?

Good question. The answer is that the MIPS is also an
excellent processor with strong semiconductor backing. There
are some who believe that they will be able to scale this
architecture to very high performance levels - approaching
"super-computer" levels on the desktop. For this reason we
need to be involved and assure people investing in Windows
that they will not be cut off from this avenue of innovation.

(9)   IBM has announced that PM will be ported to AIX and the
        RS6000. Will IBM port either NT/Windows and/or OS/2 3.0 to
        the RS6000?

They are licensed to do so, but you should ask IBM what their
plans are.

(10)   Follow-up question - if IBM is porting PM to AIX, and has
        embraced DCE, and is investing in Patriot Partners, seems
        like the both MS and IBM are both abandoning OS/2 - what is going
        on?

Both IBM and MS continue to invest large sums in OS/2. Joe
Guglielmi has said that "IBM will spend whatever it takes".
We applaud that. For our part MS's large LAN Man investments
are based on OS/2.

The difference between IBM and MS is simply that MS believes that in addition to providing a path forward for present OS/2 customers, MS has to provide a path forward for Windows customers - this is not a priority for IBM. Likewise IBM believes it has to provide a path forward for its AIX customers, this is not a priority for MS.

(11)   Is NT/Windows mid-range or high-end in you recent classification?

We class NT/Windows by virtue of its focus on high performance MIPS h/w, and the corporate developer, as being "high-end". It does not compete with Windows 3.0 on the 386.

D. IMPLEMENTING OS/2 & PM APPLICATIONS ON NT - BACKGROUND

This is some short background on the issues of supporting OS/2 applications on NT.

The approach that we have outlined to IBM as our likely course of action is to do the following, which will allow 32bit OS/2 (note that all OS/2 32bit programs are "PM" applications, there is no 32bit VIO) programs to run in a separate screen group on NT. This means that the user would flip between a screen with all his Windows applications, and a screen with his OS/2 applications. He would see a separate Shell in each screen group.

The plumbing supporting the above would consist of:

-          a "client library" which would be bound into the OS/2 application program, and which would field all OS/2 calls, and route them wherever possible directly into the NT Executive, or if not possible, to modules in the Windows32 server (see next point).

-          several additional modules which would be linked into the Windows32 subsystem server (which is a process which houses modules supplying services for the "Win32 Base", "Win32 (User) Window and Input Management", and "Win32 GDI" or graphics). The additional OS/2 modules would comprise:

a.   An OS/2 Base services module - which would supply services for "base OS/2" functionality (semaphores, shared memory, exceptions, etc). This code is fairly complete - it needs about 2 more man-years to complete and test.

b.   An GPI module which would field PM graphics calls and then map them down on the Window32 Graphics Engine, which resides in the same address space. Sharing the graphics engine would mean that we would not have separate display and print drivers for Windows32 and OS/2. This module would be primarily a layer and would not be a "lot" of code.

c.   A "PM User" module which would provide window management and input services, calling into the Windows32 Graphics Engine, and the Windows32 User to get input events. This would be accomplished by completing the port of OS/2 2.0's PM User to "C" and 32bits and adapting to call the Windows32 pieces.

This work is basically complete, but has not been tested in any way, and not adapted as would need be to work with the Win32 services.

Completing the above items is probably in the region of 20 man-years of development work, and probably 18-24months of elapsed time with testing (my estimates). This assumes that we have a knowledgeable core of developers.

The issues with the above that IBM (and others) would like to see addressed are:

1.   Supporting 16bit OS/2 applciations.
2.   Allowing Windows and PM applications to "share the glass" (ie. not run in separate screen groups), and share other facilities (eg. clipboard, DDE?).

The quick discussion of items 1 and 2 is:

1.   Supporting 16bit applications.

The issues that cause us to shy away from supporting 16bit PM apps are:
-       apps with mixed 16/32bit code,
-       apps that run at ring 2 (done to gain IOPL),
-       apps that use private device drivers,
-       apps that make extensive use of device driver dependent IOCTLs.

If we were to (as we have done for WLO apps - ie. Win16 apps on OS/2 1.x/2.x, and for running under Win32 on NT) define the concept of a "clean" PM-16 application (ie. one that does not do any of above), then we could support these "clean" apps without undue hassle. This would probably (I think) buy us the ground cover that Mikehal has been asking for.

However, the hard part is that there is at least one significant "application" that is not "clean" in the above sense, and which affects others - that is IBM's EE (mainly the Comm Manager). IBM would need to port EE to NT (note because of device driver differences, this is more than porting EE to "32bits"), and provide 16bit "reverse thunks" to enable PM-16 apps, that call EE services, to run.

If we wanted to pick up 16bit VIO apps, we would probably have to restrict this to x86/xGA systems - as VIO has dependencies on that architecture. The rest would could actually be portable to RISC - we could emulate OS/2 16 apps in the same way as we plan for Win16 apps when on RISC.

2.   "Sharing the Glass"

This is hard, as it implies a restructuring of the Window Management Software. In essence the underlying Windows "window manager" has to

offer interfaces that would allow one to layer the PM window manager on top.
This means significant changes to both the Windows and PM window managers.

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Jeff - I hope you were being facetious - "one of the easiest talks" - "60 minutes" to clear up all the confusion in the world, explain our relationship with IBM, etc.

Actually in looking at the agenda, I am a little concerned that we coordinate our messages, particularly between MS and the invited speakers (Amadeus and Reuters). The message that I will be giving is "Windows-centric" in all respects:

- Windows is succesful
- We are going to enhance, expand, re-inforce Windows to make it even more successful, in every import market segment - laptop, desktop, server, etc.
- We are supporting OS/2 as a stepping stone to future versions of Windows, not vice versa, ie.
  - OS/2 has the capabilities needed here and now for the server,
  - but in the future we will support OS/2 as one of the capabilities of NT, but no-one should be confused as to which API (ie. Windows) we think the majority of applications will get written to.
- We know what IBM is doing and "wish them well", but we are quietly sceptical that OS/2 2.0 will be a "better Windows than Windows".

Thus, I am concerned that Amadeus and Reuters know this, and will not refute/undermine it in some sense - eg. have Amadeus say "Yes, we are using OS/2 now because Windows can't hack it, and as for the future, well we will make a decision once IBM and MS have stopped fighting - and we have a UNIX project underway to give us some insurance". This may be reality (?), but we sure as hell don't want it said in public on our stage.

Have these aspects been thought thru? Have we briefed Amadeus, Reuters adaquately, do we know what they are likely to say, etc?

This piece of mail is occasioned by:
- my reading your memo on the two h/w trends likely to have most impact on MS (small hand-held devices and HDTV),
- by my realization that in Robs's h/w group we actually have some very bright people (once again, as with Intel and the i860, they are the ones really debugging the R4000 - fortunately MIPS is smart enough to realize this, and is openning up to us, and is now taking the simulation models that Robs & co. developed and stitching mating them with the other models that they have),
- and thinking about the objections that Compaq has registered with respect to MS making actual schematics (as opposed to specifications) available to the industry.

The basic thought that I have is that on the one hand, it is very, very useful to have "platform" (ie. h/w and s/w) thinking be an integral part of our approach - on the other hand it is not clear that the model that we want to have is one where design everything (h/w and s/w), and everyone else is manufacturer only. On this latter point, Carls is going to prepare some backround on this to enable us to think through these issues clearly, and get a decision that has a half life longer than a few weeks.

However, my own personal thinking is that we want to use the considerable talent in the hardware group to help us pioneer "new platforms", examples being the MIPS Jazz workstation, and a good MIPS multiprocessor design. But once we have pioneered a platform, they should allow the platform manufacturers to take the ball forward. I think MIPS can and will be capable of serving the function of the licensor of technology andesigns to the industry - they can elaborate Jazz, etc. We (MS) do not need to be doing the elaboration.

So what is the next platform beyond a MIPS MP machine that needs to be pioneered? Probably the hand-held devices that you refer to.

These hand-held devices probably embody design and manufacturing approaches that Robs and his people are not familiar with (eg. packaging and power management) - but there are probably system & s/w considerations (like putting a decent processor/memory complex on them) that are not fully appreciated by the consumer electronics folk. So having our "platform" team work with a consumer electronic firm(s?) on this would be probably a useful thing to do. The point is however I think we could learn a lot by taking a "complete platform" approach - there would be lot of mutually beneficial feedback by having a h/w & s/w team really push the state of the art.

The timing on this would be in late '91 or early'92, we can start break loose people out of Robs's group and maybe 1-2 OS s/w people to start thinking through the platform. As an aside, I think we need some senior OS people starting to think thru the OS issues early on - we will need a light-weight, portable kernel that can support as much of Win32 as possible, whether this is some derivative of NT or not is an issue that needs thought. If we do not staff it with people with knowledge of NT, entropy will ensure that it is not a derivative of NT. BTW - NT is structured into a set of layers, the lowest layer (the kernel) that exports basic synchronization primitives etc. to the rest of the OS, is only 60KB of object code.

So... this would mean that we have define the following platforms as the ones that we MS will "pioneer" by doing a complete h/w and s/w implementation and then in each case deciding how to make the intellectual property available:

1.   Jazz (MIPS w/s) -> xferred to MIPS with rights to sublicence
2.   MIPS MP design -> xferred to MIPS with rights to sublicence
3.   Hand-held

The issue of HDTV systems will I think be a much longer term issue - HDTV is dependent on an entire industry infrastructure being developed - new transmission systems, new cabling, etc has to be put in place. It will come, but it will take many years (>5) to become a market reality. The hand-held market though needs no infrastructure, with the right platform standards it could be an explosive market - faster in growth and larger in absolute numbers within a few years than "dekstop" systems.

Additional MS Questions/Answers:

1.   Is MS either designing, developing, manufacturing computer systems - RISC or otherwise?

Answer:

No, MS has no plans to enter the computer systems business. We are and always plan to be a software company.

[Stop here. If pressed further (eg. "But I saw ad in MS News for h/w designer"), then]

We do have h/w engineers on our staff:
(i)   we have a thriving mouse & peripherals business, no new news here, and
(ii)   we have designed prototype h/w platforms for internal development and testing of our software where there is no suitable system that we can purchase or obtain from an OEM. It also ensures that we have skilled people who can give input and advice to our OEM customers.

2.   When exactly will OS/2 3.0 ship:

We expect developers kits this year (1991). This is the only firm commitment that we can make, although clearly it is our goal to ship final product as early as we can.

If really pressed further, "when is your goal" - clearly we would like to ship final product in 1992, but we will announce a date when we have shipped the developers kits this year. One step at a time.

3.   What is more important to you on NT: the PM API's or the Windows API's? Will ship Windows on NT before PM?

While it possible to ship only Windows or only OS/2 support on NT, our goal is to ship both [Just stick fast if pressed further].

4.   If OS/2 3.0 ships in 1992, wont it compete with OS/2 2.0?

No, the systems are complementary - they run the same apps. There will no doubt be a period when the two co-exists. No major operating system version is replaced overnight.

5.   What does OS/2 3.0 have that OS/2 2.0 won't?

They will share a lot of capabilities, but OS/2 3.0 will:
-     be portable, ie. run on MIPS
-     run 32bit Windows applications when these are available

-       offer multiprocessor support, and security
-       run POSIX apps.

6.   Can't IBM add all these to OS/2 2.0?

        Conceivably they could, but it would take a lot of time - beyond
        1992, and why would they want to?

7.   What do you think of IBM's plans to run Windows applications on OS/2
        2.0, and make it "better Windows than Windows"?

        We would be very pleased if IBM could do this, it would greatly
        benefit those customers and vendors investing in Windows applications
        - but this is not straightforward thing to do. We took a close look
        at doing this in developing the WLO product, and realized that to
        make a blanket compatibility statement is tall order. We would not
        feel comfortable committing that this capability will be in OS/2 2.0,
        and if you ask them directly neither will IBM.

8.   Then why do you think you can do this on OS/2 3.0

        Because we will be "building" Windows and PM side by side into the
        product - OS/2 3.0 is specifically allows this. One does not have to
        laid onto of the other.

9.   But isn't this what IBM is proposing to do with DPMI and Windows 3.0
        on OS/2 2.0 - have PM and Windows side by side?

        Possibly, but the hard thing is to make it appear integrated to the
        user and not a "compatibility box" - this takes explicit OS support.

10.   IBM is telling me that they will "never" support OS/2 3.0, that it is
        not the successor to OS/ 2.0

        That is not our understanding. While we cannot make announcements on
        IBM's behalf, IBM stated with MS last September that we and IBM would
        cooperate on a portable version of OS/2. IBM is fully licensed to
        OS/2 3.0.

I would like to "push the envelope" a little in terms of ISV endorsements, private press releases. This is to ensure that people get the "Windows" message, which otherwise gets lost. What I would like us to do is to hand out a sheet that has the paragraphs below on it, and the contact names of the ISVs who have agreed to speak to the press. Cameronm/Rossc/I beefed up, dropped names from the list today - the intent is to (i) get rabid Windows fans, (ii) get ISVs who are representative of the broad mainstream - not just UNIX'y (we want to position ourselves as "mainstream" vs. UNIX-is-a-niche), (iii) who will not "damn us with faint praise" (eg. Oracle, Lotus high exec's). The names we are tragetting are:

Confirmed:

Iris, Aldus, Wolfram, Wolfram, Mgraphx, Symantec, Interleaf

Still to be confirmed:

Autodesk, Corel, Lotus/Ami, Precision, ParcPlace

I am tempted to add Mike Maples - but we should not, it will provoke more "hate reporting".

We (all MS folk) would hand the sheet out, but it would not be part of the formal kit. I will take bunch with me to Europe.

Paragraphs that will head the contact names:

INDEPENDENT SOFTWARE VENDOR CONTACT NAMES

End-users purchase computers to run applications software. The two largest bases applications software in the world are DOS applications and Windows applications. Windows is also the fastest growing segment, and is attracting the major share of effort by independent software vendors today.

By its emphasis on compatibility with today's PC world, the ACE initiative, with its inclusion of OS/2 3.0, will benefit from this investment. This is because of the ability of OS/2 3.0 ability to run both todays DOS and Windows 3.0 applications directly. In addition, OS/2 3.0 will support future versions of Windows applications written to an extended 32bit specification ("Windows-32"), which will also be supported in future versions of Windows on DOS.

Provided below are the names of vendors investing in Windows applications software, and who have agreed to provide comment on the ACE initiative.

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