Microsoft Memo

Subject: Novell DR-DOS 7 and Personal Netware Product Bundle Analysis
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NOTE: This document is based on preliminary information about both products, and as such, may contain inaccuracies. Please email any questions you have concerning this document to "bobt", Bob Taniguchi. Once Novell has release the product, we will update this document with any changes that reflect the final product, and a more technical product analysis.

Executive Summary

Novell is preparing to release a product bundle containing the forthcoming DR-DOS 7 and a renamed version of NetWare Lite, now known as Personal NetWare. (referred to as PNW in this document). This document is designed to give you objective data on this release and help you understand the advantages of Microsoft's solutions. In the absence of shipping versions of the product bundle, the top line features were deduced from the best available data, namely early product reviews and attending Novell sponsored conferences.

The Anticipated Novell Positioning

Novell will claim that Personal Netware/DR DOS 7 is the DOS for networking and is the perfect environment for computers attached as clients in NetWare networks. Their positioning of DR DOS 7 additionally asserts that this is *the* power user's DOS with new features like DPMS (Novell's new protect mode interface) and multi-tasking of MS-DOS applications. Novell further contends that they provide the best peer-to-peer networking solution with PNW and are positioning PNW for existing NetWare sites as the Universal Client that also enables your computer to connect to Netware 2.X, 3.X, and 4.X networks. What is the reality?

Network Connectivity:

- PNW's core new features; backup, SNMP support and TCP/IP support are currently available in the VLM shell that Novell offers for a $99 site license to existing NetWare customers, hence, PNW offers no new features of real value to current NetWare sites.
- PNW offers peer network services much like WfW 3.11. However, PNW users must contend with the product's lack of support for other vendors' networks. The Personal NetWare client is NOT a universal client and is only designed for the Netware family of servers. Additionally, at Brainshare '93, Novell disclosed that existing NetWare clients (3.X and 4.X) will not be able to access forthcoming Personal Netware servers further diminishing PNW's role in a corporate network.
- Personal Netware's network browsing and printing facilities are not well integrated with existing Netware 3.X and 4.X facilities. This will result in end user confusion and increased support and training costs. Many of the key Personal Netware features such as TCP/IP support are bundled with the Netware 3 and 4 clients anyway.
- WfW 3.11 in contrast offers good third party network support, full protect mode operation for network and file I/O offering greatly improved performance and reliability, with FAX, remote access, mail and scheduling included at no additional cost. Additionally for NetWare sites, WfW out of the box works well with the VLM shell previously mentioned.

Compared to MS-DOS

- *DPMS:* The goal of DPMS is to free more conventional memory space for MS-DOS apps. MS-DOS delivers this today via it's LOADHIGH command, and the ability to load MS-DOS in high memory. In practice, to implement DPMS third party device drivers will need to be updated, though we know

of NO ISVs that are planning to support the standard. Even Novell does not support it with all the drivers in the DR-DOS box.

- *Memory Optimizer:* Novell does not include a memory optimizer like Memmaker. So the only drivers they can manage are the few that they "DPMS" and that is a small fraction of the thousands of drivers in the total universe.

- *Windows Compatibility:* Novell has already acknowledged that DR-DOS 7(specifically multi-tasking) and PNW will be incompatible with third party memory managers, the current version of Windows 3.1 running in enhanced mode. Early reports from OEMs confirm that the incompatibility also impacts Windows for Workgroups 3.11. Given that over 30% of new PCs will ship with WfW 3.11 pre-installed, and the growing application and hardware support for Windows, we feel that this is an item of serious customer concern.

- *Multi-tasking:* This is a cool feature, but is by no means a new capability. MS-DOS only users get a better solution with Desqview which has been available for ages. Our solution is Windows itself. The majority of active PC software buyers are Windows users and thus have a better solution already. In fact, Novell has acknowledged that their multi-tasking is incompatible with Windows Enhanced mode. This makes DR-DOSs multi-tasking feature of no value to the majority of PC users.

- MS-DOS, on the other hand is broadly supported by third party memory managers, utility vendors, and hardware vendors, i.e. no compatibility issues exist. Its safety advantage is further enriched by its unique disk media analysis/repair utilities for regular and DoubleSpaced drives such as ScanDisk, DoubleGaurd and the Himem memory check. No other MS-DOS imitators possess these safety tools. Additionally, MS-DOS 6.2 offers the best built in memory optimizer as well as including strong versions of backup, undelete, and virus-detection for both MS-DOS and Windows.

In light of the above product issues, the impact to the market and customers are likely to be increased support costs. Customers and third party software and hardware developers are minimally faced with allocating resources to independently test DR-DOS and PNW for product compatibility. Customers adopting DR-DOS may find that their applications, memory management utilities and device drivers will not function properly. Since it's likely that vendors of these products may not offer an update of their product with DPMS support, the customer is stuck in the middle without a viable solution. With MS-DOS and our Windows products customers can be assured that:
- That support people worldwide are well trained on these standards
- Thousands of books and support materials are available
- In addition to Microsoft's extensive testing, ISVs test their applications and drivers on these platforms.

In summary, Novell's new offerings seem to raise significant compatibility concerns with the installed base of MS-DOS, Windows, and Windows for Workgroups customers while providing only incremental benefits to customers focused entirely on Novell systems products. We feel we have much stronger products and there are not any compelling reasons for anyone to switch to DR DOS 7 and Personal Netware from MS-DOS 6.2 and Windows or Windows for Workgroups. Users who do have MS-DOS 6 and Windows can upgrade to 6.2 and WfW 3.11 for less money and have a better solution. Users who own a version of MS-DOS prior to 6 will get more benefits with the Microsoft solution.

What follows is the more in depth analysis of the DR-DOS 7 and PNW bundle, and how they compare to MS-DOS 6.2 and Windows for Workgroups 3.11 on a feature basis:

Detailed Analysis - MS-DOS 6.2 and DR-DOS 7
Disk compression
Disk compression is a key technology to all PC users--everyone is running out of hard disk space. However, the way that Novell and Microsoft have chosen to offer disk compression to customers varies significantly. In DR-DOS 7, Novell has chosen to replace the SuperStor disk compression in DR-DOS 6 with Stacker. DR-DOS has added key DoubleSpace features such as integration with the OS. This is good for their customers. However, DR-DOS doesn't provide the additional safety features offered by DoubleSpace's ScanDisk and DoubleGuard

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Memory Management

DR-DOS 7 offers DOS Protected Mode Services (DPMS) as their memory management feature. DPMS enables users to run drivers and TSRs in protected mode. Novell has provided DPMS drivers for several though not all of the utilities in DR-DOS 7. This technology is beneficial because it provides users with more conventional memory. However, DPMS is incompatible with the standard MS-DOS DPMI.The VxD protect mode driver model in Windows supports DPMI and is the protect-mode standard in future releases of Windows as well. To date, there are *over 300* independent hardware vendors which have developed VxDs for Windows. We do not know any developers doing the significant work to support DPMS in light of the DPMI standard and the VxD protected mode driver model supported by Windows.

DR-DOS 7 doesn't include any memory optimization program like MS-DOS 6.2's MemMaker. While DPMS provides support for only a handful of device drivers (useful if those are the only drivers you need), users can get more conventional memory by using either MemMaker or third party memory managers to optimize *all* TSRs and device drivers. This means that DR-DOS 7 users must purchase a third-party memory manager to get the same amount of conventional memory. Microsoft's MemMaker provides easy and safe memory optimization for all users while allowing the flexibility for advanced users to customize their systems.

Multitasking

On the surface, the multitasking feature in DR-DOS 7 appears to be a technological gain and may provide multitasking of MS-DOS based applications to some customers with this requirement. Probably most of these customers have Desqview. However, this comes at a cost. Novell acknowledged that their multitasking in DR-DOS 7 is incompatible with Windows in 386 Enhanced mode, which will negatively impact the majority of Windows users today. In addition, PC Week reports that multitasking will probably break third party memory managers.

Data protection technology

MS-DOS 6.2 includes a new disk analysis and repair tool called ScanDisk to provide an extra protection for data. ScanDisk diagnoses and repairs errors on both DoubleSpace and uncompressed drives. Its features include:

- Crosslink and lost cluster detection and resolution.
- Repair of damaged portions of Compressed Volume Files and recovery of data.
- Hard disk surface analysis and marking of bad sectors while "hotfixing" the disk by moving data from the bad sector to a good sector.
- Ability to undo any changes made to the hard disk.

DR-DOS 7 has no such tool. Stacker disk compression does comes with a limited surface scan for Stacked drives only. It doesn't have a utility with the breadth of diagnostic and repair features available with ScanDisk.

Detailed Analysis: Windows for Workgroups 3.11 and PNW

Windows for Workgroups has much better integration of the desktop OS with the wide variety of network operating systems in use by customers. The following are key enhancements made in the WfW 3.11 release:

- tight integration of the network into the Windows user interface
- support for multiple networks on the Windows desktop
- a 32-bit IPX/SPX compatible protocol for fast reliable communication over NetWare-based networks;
- TCP/IP support as a standard protocol option;
- broad connectivity support for other vendors' networks like DEC PATHWORKS, Banyan VINES, and LAN Server.

Faster Performance & Improved Reliability

Windows for Workgroups 32-bit architecture ensures greater reliability and significant performance improvements in a protect mode environment. For example, hard disk access can be improved by up to 150% with 32-bit disk and file system drivers that benefit network, standalone and remote PC users. In addition, network access is up to 100% faster because of the new 32-bit NDIS 3.0 network-card drivers in Windows for Workgroups 3.11.

For Personal NetWare, the drivers are real-mode drivers and include support for DPMS. While this may free conventional memory for users, there is a cost associated with this implementation. A consequence is slower performance since the drivers are 16-bit rather than 32-bit. A second effect is that vendors today support a more powerful protect mode standard: the Windows VxD model. Thus users face the possibility that these DPMS drivers may not work with Windows

Scalability

Personal NetWare uses the same workgroup architecture supported in Netware. This means that up to 50 users can be assigned to a workgroup. Windows for Workgroups does not limit the number of users in a workgroup thus providing users the flexibility to grow their network as needed without incurring significant incremental support costs.

Installation and Configuration

Personal NetWare is more complicated to set-up and configure as a peer-peer network than Windows for Workgroups. The reason is that Personal NetWare lacks a common user interface with NetWare 3.x and Netware 4.x. This requirement creates yet one more support burden for administrators and can affect users' productivity. Early reviews of Personal Netware by the press confirms that this issue continues to be unaddressed by Novell. Personal Netware clients must have separate logins to a NetWare 3.X or 4.X server, as well as incompatible network browsing and printing facilities. The reviewers also cite that the Personal Netware installer is inadequate, they resorted to hand editing of NET.CFG.

In contrast, current Windows users can install Windows for Workgroups and use this product almost immediately. The Windows for Workgroups installation utility automatically detects and loads the proper device driver and configuration for over 130 network cards. Additionally WfW provides a graphical Windows version of Setup and configuration tools (the Control Panel) for ongoing network support. This intergration with the Windows user interface also includes a new toolbar in the Windows File Manager and Print Manager that provides a consistend and easy way to perform common tasks such as accessing network drives and shared resources for all networks supported by WfW.

Mobile Computing

For standalone and mobile users computing from home or other remote locations, Windows for Workgroups offers a complete remote access solution. The Remote Access Services client built into Windows for Workgroups allows users to remotely access resources on Windows NT or Windows NT Advanced Server-based networks. By the end of the year we will offer a point-point server that allows mobile users to dial into another Windows for Workgroups machine and access its hard disk. Finally, Windows for Workgroups includes the Microsoft at Work fax software, the *first* PC-based implementation of the Microsoft at Work technology, which allows users to send and receive fax messages and fax files that can be edited from one Windows for Workgroups-based machine to another.

As of the time of this document, it's unclear how Novell is supporting users that must access their PCs remotely. In addition, from the public information available on Personal NetWare, there is no discussion of a product strategy to address mobile computing needs

PC DOS 6.1 Compression Implementation

- **No error checking before compressing or uncompressing a drive**

PC DOS 6.1 compression assumes that the file system and disk are in perfect order. It does not do any checking in case for file problems. If users have problems on their disks they may experience data loss. MS-DOS 6.0 ran CHKDSK to verify file system integrity before compressing a drive, and MS-DOS 6.2 runs ScanDisk to verify both the file system and physical disk before compressing and uncompressing.

- **No DOUBLESPACE.BIN placed on boot floppy**

If you try to boot a system containing a PC DOS compressed drive using a PC DOS boot floppy, you will not be able to access the compressed drive. When you format/s or sys a floppy using PC DOS 6.1, it only puts on the two PC DOS kernel files (IBMBIO.COM and IBMDOS.COM) and COMMAND.COM, leaving off DBLSPACE.BIN. Users must manually copy over the BIN file if they wish to use the floppy on compressed systems. Once they do so their DBLSPACE.BIN will always load in memory, even on a system with no compressed drives.

MS-DOS automatically puts DBLSPACE.BIN on the floppy then checks for the presence of DoubleSpace when the system is booted. If DoubleSpace is present the BIN stays loaded, providing access to the drive; if DoubleSpace is not present then the BIN file releases its memory.

- **Uncompress failure when more than 512 root directory files and/or directories**

The root directory on either an MS-DOS or PC DOS system supports a maximum of 512 files and directories. Because uncompressing a drive combines the compressed drive's root directory with the host drive's root directory, it is possible for each alone to be under 512 entries but the combination of the two to exceed the limit. PC DOS 6.1 uncompress will fail when it tries to make the 513th entry. MS-DOS uncompress checks this condition before running and, if the limit will be exceeded, notifies the user to adjust their system and rerun uncompress.

- **Uncompress space check**

A compressed drive may become too large to uncompress. In that case users need to back up some files and delete them so the remainder can be uncompressed. PC DOS 6.1 will notify users that they need to free up space, but does not tell them how much. Users must resort to trial and error. MS-DOS uncompress notifies users how much space needs to be freed.

- **Interrupting Uncompress**

Because a partially uncompressed system leaves files spread across the uncompressed and compressed drives, it is important that the process be robust. PC DOS uncompress does not automatically restart if interrupted and even allows users to escape mid-cycle, leaving the system in a half uncompressed state. MS-DOS uncompress is restartable. Even in the event of a power loss, when restarted the system will automatically complete the task.

- **DOUBLESPACE.SYS line in CONFIG.SYS not updated by PC DOS 6.1 Setup**

While PC DOS adds its version of DOUBLESPACE.SYS to the system, the setup program does not update the DOUBLESPACE.SYS line in CONFIG.SYS. If a user's MS-DOS version of DOUBLESPACE.SYS is in a different directory than where PC DOS is installed, the unchanged CONFIG.SYS entry will point to the MS-DOS version of the driver instead of the PC DOS version. Common scenarios leading to this would be a user who puts their drivers in a separate DRIVER directory, or a user who installs PC DOS into a different directory than they installed MS-DOS. When the system is rebooted with PC DOS kernel files and an MS-DOS DOUBLESPACE.SYS the system may lock up before reaching the command prompt. MS-DOS installation updates the CONFIG.SYS to reflect changes in the path of new files.

- **Less than 32 MB Compressed Partition Incompatibility**

On large partitions users may create more than one compressed drive. For instance, users may make one maximum-sized DoubleSpace drive and use the remaining disk space for additional compressed drives. If any of the additional MS-DOS compressed drives are less than 32MB (16MB Compressed Volume File), converting to PC DOS 6.1 and its SuperStor compression leaves the compressed drives inaccessible.

This information is based on preliminary information on both Novell products and as such may contain inaccuracies. When the product is released, this information will be updated with any changes to the final products.

	MS-DOS 6.2	*Novell DOS 7 (DR-DOS)*
Disk Compression	Double Space • ScanDisk diagnose and repair both compressed and uncompressed volumes. Automatically run prior to compression of data. Provides a broader diagnostic and repair of data than provided by Novell DOS 7. • DoubleGuard, protects DoubleSpace from misbehaved programs that try to improperly use memory reserved by DoubleSpace • Boot floppies recognize compressed volumes	Stacker (Replaces SuperStore) • Surface Scan utility does not scan uncompressed drives. Provides limited data protection features • No comparable feature. ?
Memory Management	• The standard is MS-DOS DPMI. • Supported by Windows VxD protect mode driver model. • Is the protect mode standard for future versions of Windows. • Excellent IHV driver support for Windows VxD	• Offers Novell's DOS Protected Mode Services (DPMS) • Not supported by all utilities included with Novell's DOS 7 • No significant support by 3rd party IHV's • Does not support Windows VxD model.
	• MemMaker or 3rd Party Memory Managers will optimize all TSR's and device drives for maximum conventional memory usage.	• No comparable feature offered by Novell or 3rd party.
Multitasking	• Not offered by MS	• Incompatible with Windows Enhanced Mode. This means that Windows won't run in Enhanced Mode on Novell DOS 7. • May break 3rd party Memory Managers
Cool Features	• Backup, Undelete, & Anti-Virus	• ?

	Windows for Workgroups 3.11	*Personal Netware*
32-bit Windows network drivers.	• Yes, faster network performance.	• 16-bit.
Universal Network Client	• Offers broad support for Multiple Network Vendors out of the box, plus optional support for others.	• Support only for Netware servers out of the box. • Existing Netware clients will not be able to access PNW servers. • PNW UI is different when accessing Netware 3.x or 4.x servers
Users per Workgroup	• Not Limited	• 50
Network DDE	• Yes	• No
Workgroup Apps included	• MS-MAIL • Schedule +	• ?
Remote Access	• Client Included NOW • Point to Point soon.	• Not offered
FAX	• Integrated MS At Work Fax Software • Any windows application can print to a "FAX" printer • Integrated into MS-MAIL • Share Networked FAX Card	• Not offered

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