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Operating System

Choosing the Best Windows Desktop Platform
For Large and Medium-Sized Businesses and Organizations

White Paper

June, 1998

ABSTRACT

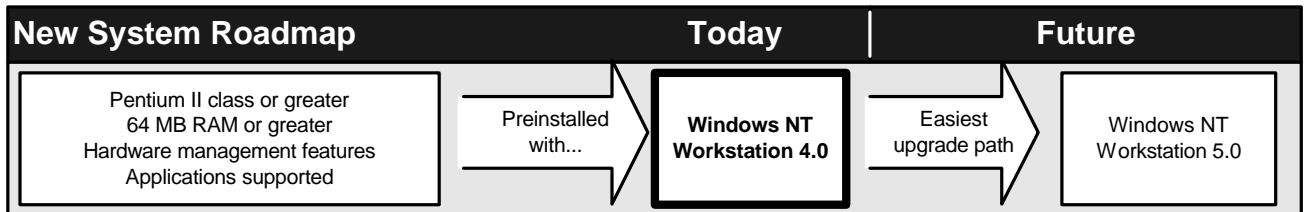This document provides Microsoft's operating system deployment recommendations for business desktops – today and for the next few years. Supporting information describes how Microsoft arrived at these deployment recommendations. Keep in mind that every business and desktop environment is unique, so these recommendations should be considered general guidelines. Systems should be tested before deploying.
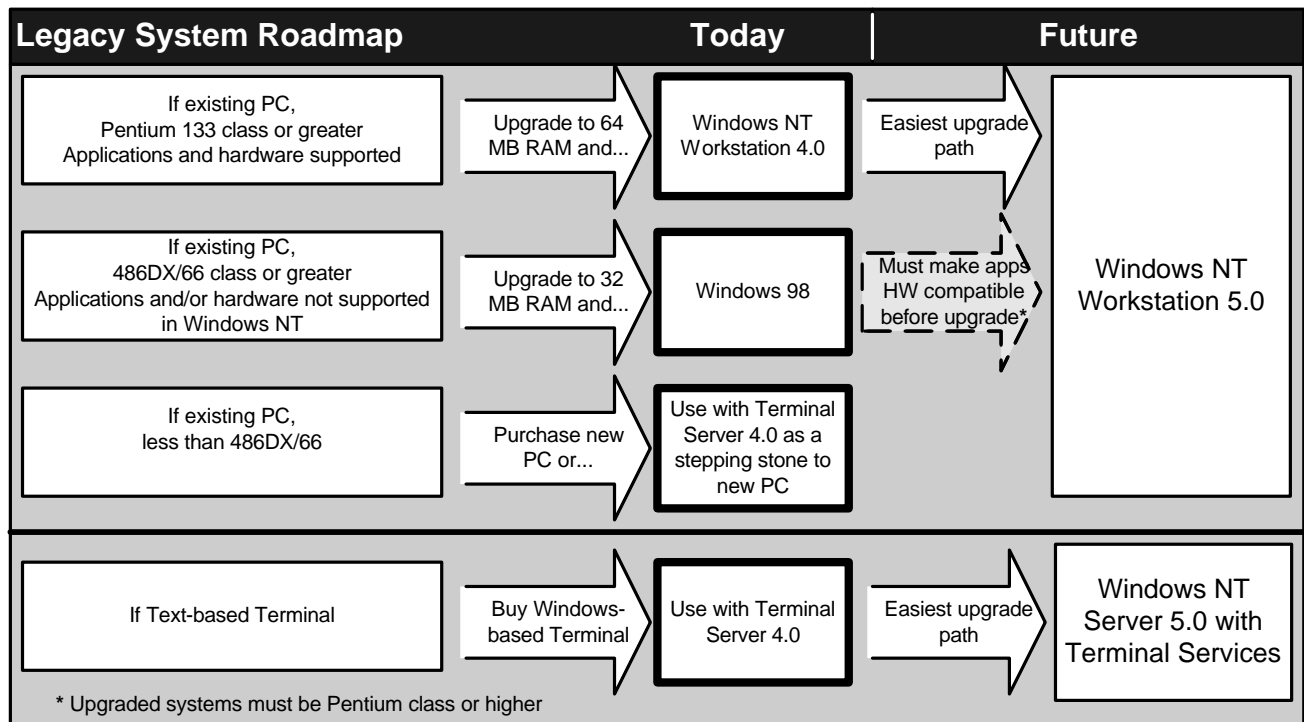
DEPLOYMENT RECOMMENDATIONS SUMMARY

Most importantly, Microsoft recommends that businesses move to **32-bit Windows®-based applications**. Modern 32-bit applications offer greater reliability, better performance, lower total cost of ownership (TCO), better productivity, and more security than 16-bit Windows-based and MS-DOS®-based applications. In addition, 32-bit applications are best poised to take advantage of hardware and operating system innovations.

New System Roadmap	Today	Future
Pentium II class or greater 64 MB RAM or greater Hardware management features Applications supported	Preinstalled with... → **Windows NT Workstation 4.0**	Easiest upgrade path → Windows NT Workstation 5.0

When Purchasing New PCs

For companies buying new PCs – desktops or portables – Microsoft recommends using the **Microsoft® Windows NT® Workstation 4.0** operating system**.** As the Microsoft "business" operating system, Windows NT Workstation 4.0 focuses on reliability, security, performance, and manageability. New portables should include manufacturer-supplied Plug and Play as well as power management capabilities. To take full advantage of the new generation of applications, newly purchased PCs should have a minimum of **64 MB RAM** and include hardware management features such as Advanced Configuration and Power Interface (ACPI). With its shared registry and common architecture, Windows NT Workstation 4.0 promises to be the easiest path to Windows NT Workstation 5.0. *For details on Windows NT Workstation 5.0, see Section III.*

When Upgrading Existing Systems

Legacy System Roadmap | **Today** | **Future**

Legacy System	(path)	Today	(path)	Future
If existing PC, Pentium 133 class or greater Applications and hardware supported	Upgrade to 64 MB RAM and...	Windows NT Workstation 4.0	Easiest upgrade path	Windows NT Workstation 5.0
If existing PC, 486DX/66 class or greater Applications and/or hardware not supported in Windows NT	Upgrade to 32 MB RAM and...	Windows 98	Must make apps HW compatible before upgrade*	Windows NT Workstation 5.0
If existing PC, less than 486DX/66	Purchase new PC or...	Use with Terminal Server 4.0 as a stepping stone to new PC		
If Text-based Terminal	Buy Windows-based Terminal	Use with Terminal Server 4.0	Easiest upgrade path	Windows NT Server 5.0 with Terminal Services

* Upgraded systems must be Pentium class or higher

Microsoft recommends moving existing "optimized" desktops (i.e., Pentium-class CPU, 64 MB RAM, and compatible hardware and software) to Windows NT Workstation 4.0. This provides existing desktops with the same benefits as new PCs. Microsoft offers several tools for qualified IT professionals that automate the deployment of Windows NT Workstation 4.0. (Customers moving to Windows NT Workstation 4.0 from Windows 95 should be aware that machine and user specific settings and applications must be reapplied after installing Windows NT Workstation 4.0.)

Most desktops that cannot be moved to Windows NT Workstation 4.0 can benefit from the **Windows 98** operating system. Windows 98 is easier to deploy and support than Windows 95. In addition, because upgrade processes cannot easily replicate a user's personal settings and applications, it's often simpler to move capable Windows 95-based desktops to Windows 98. For upgrading to Windows NT Workstation 5.0, Microsoft plans an automated upgrade path from Windows 98 (and the Windows 95 operating system), but this will require additional steps when compared with upgrading from Windows NT Workstation 4.0. *For more information on Windows 98, see Section III.*

For desktops that cannot be upgraded to Windows NT Workstation 4.0 or Windows 98, Microsoft recommends purchasing **new PCs with Windows NT Workstation 4.0**. During the process of acquiring new PCs, **Windows NT Server 4.0, Terminal Server Edition** can be used as a stepping stone. Terminal Server eases the changeover by giving legacy desktop users the power of 32-bit Windows-based applications. *For more information on the benefits of Windows NT Server 4.0, Terminal Server Edition, see Section III.*

Businesses that use text-based terminals can purchase new **Windows-based Terminals**. This move provides "task users" access to 32-bit Windows-based applications in the secure, reliable environment of Windows NT Server 4.0.

Finally, except in rare instances, Windows 95 should not continue being deployed. Businesses committed to Windows 95 – and that cannot move desktops to Windows NT Workstation 4.0 – should deploy **Windows 98** instead of Windows 95. Windows 98 is easier to deploy and support and does not require extensive reevaluation in order to switch from an existing Windows 95 deployment plan. New PCs should include 64 MB RAM.

Windows NT Workstation 4.0 and Windows 98 are both modern 32-bit desktop operating systems. While each operating system includes a unique set of core strengths, Windows NT Workstation 4.0 is considered the Microsoft "business" operating system and Windows 98 is considered the Microsoft "consumer" operating system. The following outlines a high-level summary comparing the different platforms. Additional details can also be found on http://www.microsoft.com/windows/

Windows NT Workstation 4.0

Windows NT Workstation 4.0 focuses on reliability, manageability, security, and performance. Its multithreaded, kernel-based architecture is optimized to run modern 32-bit Windows-based applications, while also supporting many leading MS-DOS-based and 16-bit Windows-based business applications. Windows NT Workstation 4.0 supports more than 4,000 hardware devices and peripherals. Portable users now can take advantage of Plug and Play and power management tools from third-party vendors. With a shared architecture, Windows NT Workstation 4.0 is also the best networking client to the scalability, manageability and performance of Windows NT Server 4.0.

Windows NT Workstation 4.0 core strengths, as compared with Windows 95, include:

- **Better manageability**. Windows NT Workstation 4.0 is designed to be the most manageable Windows desktop. The Zero Administration Kit (ZAK) takes full advantage of Windows NT Workstation 4.0 management capabilities, including shell lock down, managed applications and file access. A well-managed PC desktop running Windows NT Workstation 4.0 can reduce total cost of ownership (TCO) by up to 35 percent when used as a personal productivity platform, according to the Gartner Group, a leading industry research firm (http://www.microsoft.com/windows/platform/info/gartnertco.htm).

- **Faster performance**. From business productivity applications to high-end technical applications, Windows NT provides the fastest performance for today's standard desktop (32 or 64 MB RAM). For example, in performance testing using the SYSmark32 benchmark, the Business Applications Performance Corp. (BAPCo) found that PCs running Windows NT Workstation 4.0 (on the same Pentium and Pentium II-class systems and 32 MB RAM) improved performance by 13 to 29 percent over PCs running Windows 95.

- **Increased reliability**. Windows NT is designed to actively protect itself and applications from errors and external damage—whether accidental or deliberate—and to respond predictably to software and hardware errors. For example, every application (including legacy 16-bit applications) can be configured to use its own private memory space. This means that if one application fails, it does not impact the other applications or the operating system. Core system components (executive) run separately from the many subsystems, so back-door entry points cannot compromise security or damage the system in any way.

- **Better security**. Windows NT and security are synonymous. The operating system includes capabilities ranging casual file protection on portables to industrial-strength protection against malicious hackers. For example, Windows NT Workstation 4.0 supports multiple user profiles on the same machine, so system "owners" can govern which users may have access to various program groups, files, and menu commands. Unauthorized users cannot "log into" a machine. Different users authorized for a machine cannot view each other's data.

Windows 98

Windows 98 is a smart upgrade for desktops that cannot be moved to Windows NT Workstation 4.0. In addition to thousands of refinements, Windows 98 is easier to deploy and support than Windows 95, and enables a new generation of innovative hardware. Highlights, as compared to Windows 95, include:

- **Easier to support**. Windows 98 features several troubleshooting wizards, including the System Information Utility, registry checking, Version Conflict Manager and a Maintenance Wizard. With such support tools in place, Microsoft estimates that Windows 98 will reduce Helpdesk calls as much as 15 percent compared to Windows 95, according to a soon to be released study.

- **Easier to deploy**. In addition to the operating system's new upgrade tools that provide an easy transition from Windows 95, a new Image Preparation Tool provides "disk image copying," which allows users to create a standard desktop setup.

- **Support for new hardware**. Windows 98 natively supports the new generation of hardware including Universal Serial Bus (USB) and OnNow, as well as the latest generation of Plug and Play and power management hardware devices.

Windows-Based Terminals and Terminal Server

With its focus on single application scenarios, thin clients are rarely appropriate replacements for full capability PCs. For example, studies show that performance on thin-client architecture degrades quickly in a typical business environment (i.e. office productivity applications with frequent multitasking and minimal graphics). Terminal Server runs Windows-based applications centrally on the server, sending only the application display output to a variety of client devices.

However, Microsoft recommends two scenarios where thin clients can be effectively deployed:

- <u>Dedicated, single application devices</u>. New Windows-based Terminals, typically priced under $500, give "task workers" (single application users) access to the power, flexibility, and manageability of 32-bit Windows-based applications running in the Windows NT Server 4.0 environment. For such single application users, legacy PCs also can be converted effectively into dedicated devices.

- <u>"Stepping stone" for legacy PCs</u>. (Legacy PCs connected to Microsoft Windows Terminal Server.) This system can run all applications locally—or run some applications locally (such as Microsoft Office) and some applications (such as a frequently updated line of business software) remotely from a Terminal Server. In this case, the workplace PCs may run older 16-bit Windows-based applications locally but users also have access to full 32-bit Windows-based applications. Microsoft recommends this scenario as an interim step until legacy PCs can be replaced with new PCs running Windows NT Workstation 4.0.

More information on Terminal Server and Microsoft's thin-client strategy can be found on <u>http:/www.microsoft.com/ntserver</u>.

Coming Soon: Windows NT Workstation 5.0

The Windows NT Workstation 5.0 operating system promises to combine the best of Windows 98, including native Plug and Play and power management, while significantly extending the manageability, reliability, security, and performance of Windows NT Workstation 4.0. In fact, improved management capabilities are expected to reduce TCO as much as 50 percent or more over other Windows-based environments. For more information on the features and benefits of Windows NT Workstation 5.0, go to http://www.microsoft.com/ntworkstation/basics/ntw5/

The following summary highlights key capabilities:

- Easiest to use

– Plug and Play

– Power management

- Most powerful

– Enhanced security with Kerberos 5 and Encrypted File System

– Support for new hardware

- Most manageable

– Document and user settings management

– Application deployment and updating

– Centralized, policy-based management
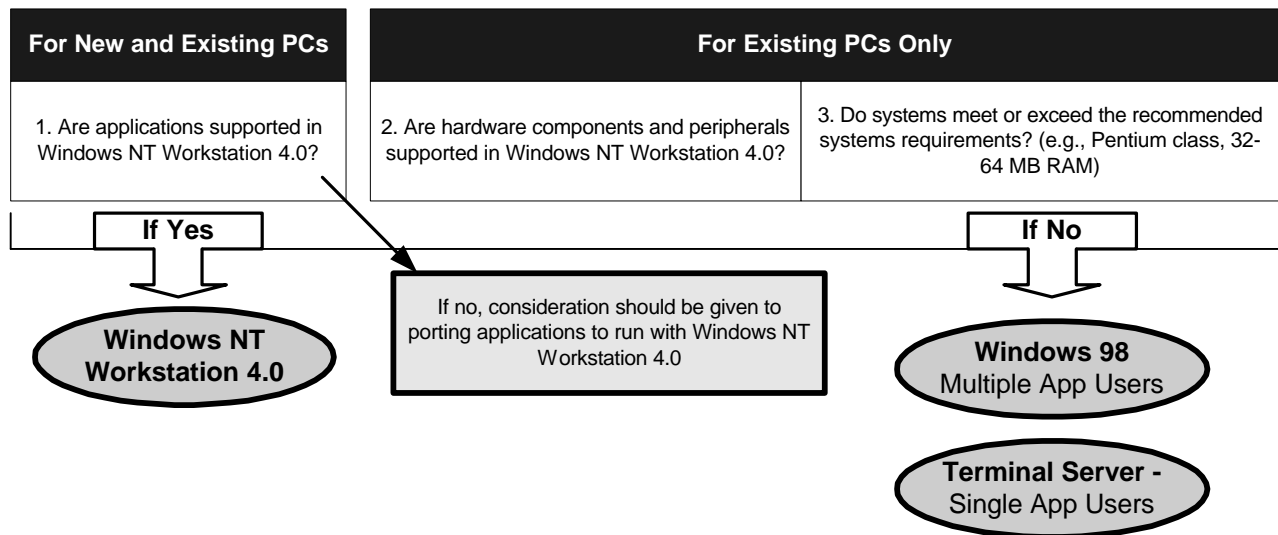
– Machine replacement

Although all 32-bit Windows operating systems are scheduled for upgrades, Microsoft believes that the best way to prepare for Windows NT Workstation 5.0 is to deploy Windows NT Workstation 4.0 *today*. Because of its shared registry, corresponding application programming model and other common components, Windows NT Workstation 4.0 promises to be the easiest upgrade path to Windows NT Workstation 5.0. For example, Windows 98 and Windows 95-based applications will often require a special conversion tool (called migration.dll) in order to be moved to Windows NT Workstation 5.0. Moreover, each application is unique and may require its own conversion program. Windows NT Workstation 4.0-based applications will be upgraded automatically to Windows NT Workstation 5.0. Also, though support will be expanded slightly, most applications that do not run under Windows NT Workstation 4.0 are not expected to run under Windows NT Workstation 5.0.

It is also important to note that all users who want to upgrade will eventually need to move to the Windows NT product family as Windows 98 is the last major upgrade planned for the Windows 9x architecture. Microsoft is planning future desktop operating system development around the Windows NT architecture.

PREPARING FOR WINDOWS NT WORKSTATION

It is important to evaluate an existing environment for application and hardware compatibility. In general, new PCs preinstalled with Windows NT Workstation 4.0 need to be evaluated only for application compatibility. If applications are found to be *not compatible* with Windows NT Workstation 4.0 (especially legacy applications), then businesses should weigh the TCO impact of using legacy applications against the benefits of building modern 32-bit Windows-based programs that can take full advantage of today's hardware and operating system platforms. If a business is switching existing desktops to Windows NT Workstation 4.0, applications as well as hardware compatibility and system requirements need to be considered. The following chart provides a simple evaluation method:

For New and Existing PCs	For Existing PCs Only	
1. Are applications supported in Windows NT Workstation 4.0?	2. Are hardware components and peripherals supported in Windows NT Workstation 4.0?	3. Do systems meet or exceed the recommended systems requirements? (e.g., Pentium class, 32-64 MB RAM)

If Yes → **Windows NT Workstation 4.0**

If no, consideration should be given to porting applications to run with Windows NT Workstation 4.0

If No → **Windows 98** Multiple App Users

Terminal Server - Single App Users

To help with this evaluation Microsoft maintains several Web-based resources:

- Are existing applications compatible with Windows NT Workstation 4.0?

    - Commercial MS-DOS-based and 16-bit applications: http://microsoft.com/windows/platform/info/16bit.htm

    - Commercial 32-bit applications: http://www.microsoft.com/windows/thirdparty/winlogo/

- Is existing hardware compatible with Windows NT Workstation 4.0?

    - Hardware compatibility list: http://www.microsoft.com/hwtest/

It's important to note that Microsoft focuses on the listing only popular commercially available products. Most line-of-business applications and no "custom" applications appear on the list.

Purchasing New PCs

While the economics of replacing versus upgrading is outside the scope of this paper, Microsoft recommends using the following guidelines when purchasing new PCs. Businesses are always best advised to purchase the highest end systems possible. The following base guidelines ensure a productive user experience as well as the ability to take advantage of software management features. These systems will also be Windows NT Workstation 5.0-"ready."

- Minimum recommended system: Windows NT Workstation 4.0 pre-installed; Pentium II class CPU, 64 MB RAM

- Universal Serial Bus (USB) – a new type of bus that enables the next generation of Plug and Play, the ability to chain together multiple devices, and faster throughput

- AGP graphics – a new bus that provides faster business application graphics performance

- Y2K compliant (Year 2000 compliant)

- ACPI (Advanced Configuration and Power Interface)-"ready"– new hardware capabilities that improve power management (e.g., enabling OnNow) and overall manageability

Automating Windows NT Workstation 4.0 Deployment

In addition to hardware and application compatibility, businesses need to look at deployment considerations in moving to Windows NT Workstation 4.0 from Windows 95. Windows NT Workstation 4.0 provides traditional upgrade paths from MS-DOS 6.x, Windows 3.x, Windows for Workgroups 3.x, and Windows NT Workstation 3.x operating systems. However, because of registry differences between the two platforms, existing applications and user settings in Windows 95 cannot be automatically applied to Windows NT Workstation 4.0. (Windows NT Workstation 5.0 will have automated upgrade from all 32-bit operating systems, including Windows NT Workstation 4.0, Windows 95, and Windows 98.) Microsoft recommends that businesses consider the need to reapply applications, user settings, and often data as part of moving to Windows NT Workstation 4.0 from Windows 95.

Businesses moving Windows 95 desktops to Windows NT Workstation can automate and customize deployment using a variety of methods.

- Use Setup Manager to create unattended answer files. By creating an unattended answer file with predetermined answers for installation questions, the installation process can run from start to finish with limited or no user intervention.

- Modify login scripts, or send embedded setup scripts in e-mail. Automate the installation process by editing the login script for the user, or sending a link in electronic mail to a batch file that runs Windows NT Workstation 4.0 Setup. In these cases, the user only needs to log on or double-click an icon to start the installation.

- Use management software such as Microsoft's Systems Management Server. Management software "pushes" the installation from the server. Using this method, Windows NT Workstation 4.0 can be installed on an individual PC without ever touching the computer.

- Use third-party solutions. Solutions are available through many Microsoft Solution Providers. Microsoft recently introduced a tool that "prepares" existing systems to accept a disk image of a fully configured operating system.

More information on moving to Windows NT Workstation 4.0 can be found at http://www.microsoft.com/ntworkstation/

CONCLUSION

Microsoft's foremost recommendation is to move to 32-bit Windows-based applications. New PCs should have the Windows NT Workstation 4.0 operating system preinstalled with a minimum of 64 MB RAM. Capable existing PCs should be moved to Windows NT Workstation 4.0. Most PCs that are not capable of being moved to Windows NT Workstation 4.0 should be upgraded to Windows 98. For existing Windows 3.x desktops that cannot be upgraded to Windows NT Workstation 4.0 or Windows 98, Microsoft recommends purchasing new PCs (with Windows NT Workstation 4.0 pre-installed) and redeploying legacy systems as terminal emulators.