

Installation and Setup

The very first contact that users have with Windows 95 is during initial installation on their computer. If the installation process is not easy, or if novice or intermediate users are confronted with a series of configuration-related questions that they don't know how to answer, their initial experience with the operating system will be bad, and that tone will be set for their first trial of the system itself. Advanced users can overcome difficult installation procedures, but their frustration level still has a finite threshold.

For Windows 95, the Setup program has been completely rewritten to offer greater flexibility and better customization than Windows 3.1. In addition, Setup in Windows 95 is more modularized than Setup in Windows 3.1, allowing the easy customization of individual Setup steps, as well as the easy installation of new custom components.

Summary of Improvements over Windows 3.1

The installation of Windows 95 has been improved over Windows 3.1 in a number of areas, including the following:

- A modular setup architecture that provides increased customization and flexibility
- An entirely GUI-based approach and improved interaction with the user, including better visual feedback of progress during setup
- Improved hardware device detection and configuration support
- Better customization of components to install
- Built-in smart recovery mechanisms for failed setup
- Built-in verification of installed components for easy correction and replacement of corrupted or deleted files
- A network setup process that is well integrated with other setup components and that provides support for a number of network installation configuration scenarios
- Support for an automated batch installation procedure, allowing Windows 95 to be installed with little or no user intervention
- Better flexibility so that PC installers, VARs, and MIS organizations can customize Setup by adding components to be installed at setup time, such as custom in-house applications

A Modular Setup Architecture

In MS-DOS, Setup is responsible for installing the basic disk operating system on the PC. In Windows 3.1, Setup is a combination of components and installation procedures inherited from prior versions and is responsible for installing the GUI on the PC. In Windows for Workgroups, the Setup functionality of Windows 3.1 was extended to install networking components on top of the GUI and disk operating system. Because Windows 95 is a complete, integrated operating system, it is now responsible for installing the disk operating system, the GUI, and the networking functionality on the PC. These responsibilities posed some interesting problems when the Windows 95 development team first approached the daunting task of writing Setup for Windows 95.

The original Setup written for Windows was not flexible enough to easily add components without making the installation procedures unwieldy. To make the installation process easier, modularized, and more flexible, the Windows 95 development team for Setup completely rewrote the installation code. As a result, Windows 95 uses more intelligent defaults and mechanisms for automatically configuring or installing key components while requiring only minimal user intervention, furthering the ease-of-use of the operating system.

For end-users, Setup in Windows 95 provides a simple, easy way to initially install and configure Windows 95. For MIS organizations, Setup in Windows 95 provides greater control and flexibility over components that are installed and offers support for automated batch installation to further simplify the setup procedure.

A GUI-Based Setup Program

Setup in Windows 95 differs from that in Windows 3.1 by featuring an entirely GUI-based setup process. Using a GUI-based setup simplifies the interaction with the user by providing better visual feedback of configured options and greater flexibility for navigating through the setup process. To support a GUI-based setup, Windows 95 features a Setup program that runs entirely from within the Windows environment. Users who already have either Windows or Windows for Workgroups on their PCs can run Windows 95 Setup the same way that they would run an installation program for any Windows-based application. For new installations, Windows 95 Setup includes the necessary components to install a minimal version of Windows to support the GUI-based setup process.

The GUI-based Setup provides better visual feedback to users throughout the installation process. Users are constantly shown where they are in the setup process and are given a number of visual cues that the system is engaged in the setup process.

The Leveraging of Detection Code

Setup's modular architecture allows the leveraging of detection and installation procedures beyond the initial setup process. The same procedures and detection mechanisms used by Setup to detect and initially configure hardware devices and peripherals during the setup process are also used for maintaining or detecting devices after installation. For example, the same code base used during the setup process for the detection of Plug and Play or legacy hardware devices is also used to detect or configure new devices after Windows 95 is up and running.

Customization Improvements

For system administrators, Windows 95 makes customization easier than Windows 3.1, which provided few mechanisms for easily customizing the setup process. Customization of Setup allows for better control over components installed into an existing environment. MIS organizations can now easily tailor the existing configuration options for Setup components, such as supported network interface cards or supported printers. Windows 95 also offers the flexibility for system administrators to add components to be installed during the setup process or to run additional procedures during the final phases of Setup.

Hardware Detection Improvements

During the setup process, Windows 95 detects the hardware devices and components configured on the computer and uses this information to install drivers and set the appropriate entries in the Registry. Unlike the simple hardware detection mechanisms used in Windows 3.1, which identified the PC configuration for a narrow group of devices, Windows 95 provides more versatile hardware detection and configuration mechanisms and provides detection support for a wider range of devices.

Windows 95 provides straightforward detection support for the base computer components, such as communication ports and processor type, but provides more robust detection of system devices, including video display adapters, pointing devices, hard disk controllers, floppy disk controllers, and network interface cards.

Hardware resources, such as IRQs, I/O addresses, or the DMA address, that are in use by more than one device can cause havoc when initially installing an operating system and may prevent the system from starting properly. Windows 95 Setup helps detect any hardware resource conflicts early in the setup process.

Windows 95 detects hardware components and devices one of two ways:

- It leverages Plug and Play detection to identify Plug and Play devices and peripherals.
- It uses a manual query detection mechanism for legacy devices and peripherals.

After Setup detects a device, Windows 95 installs the appropriate device drivers and configures the system.

The Setup Process

Setup in Windows 95 provides options to support the following four common scenarios and is designed to make it easy to install Windows 95 to meet users' needs:

- **Typical.** Most users will select this the option to perform a “typical” installation of Windows 95.
- **Portable.** This option installs the components of Windows 95 that are useful for portable or mobile computer users.
- **Compact.** This option performs a “compact” installation of Windows 95, installing the minimal files needed for proper operation.

- **Custom.** This option provides full customization of the Windows 95 setup process, allowing users to install all or selected components.

Setup in Windows 95 is less complex than Setup in Windows 3.1 from a user's perspective and is divided into the following four logical phases:

- Detecting hardware
- Asking configuration questions
- Copying component files for Windows 95
- Configuring the final system

The following sections describe what happens in each of these phases.

The Hardware Detection Phase

During the hardware detection phase, Setup analyzes installed system components, detects installed hardware devices, and detects connected peripherals. During this phase of Setup, Windows 95 analyzes the system to identify the hardware resources that are available—for example, IRQs, I/O addresses, and DMA addresses—identifies the configuration of installed hardware components—for example, IRQs in use—and builds the hardware tree in the Registry.

Windows 95 uses a number of mechanisms to detect installed hardware devices during setup. For legacy PCs, Windows 95 maintains a database of known hardware devices and performs a manual detection to check I/O ports and specific memory addresses to attempt to identify whether they are being used by recognized devices. Windows 95 also checks for Plug and Play peripherals connected to legacy PCs, which return their own device identification codes. For PCs that contain a Plug and Play BIOS, Windows 95 queries the PC for installed components and the configuration used by these components. (Windows 95 also checks for Plug and Play peripherals connected to Plug and Play PCs.)

During the hardware detection phase of Setup, Windows 95 tries to identify hardware conflicts and provides a mechanism to resolve conflicts early in the installation process to overcome the hardware configuration issues that Windows 3.1 users encounter.

When the hardware detection phase is complete, a dialog box allows users to proceed with Setup or to review the hardware devices that were detected and the system components that Windows 95 will install.

The Configuration Questions Phase

Windows 95 uses information found in the first phase to determine which system components it should install. During the Windows 3.1 setup process, users were constantly asked for system configuration information and confirmations. By contrast, Windows 95 consolidates the configuration and customization phase of Setup into a single procedure at the beginning of the setup process. Users can review the components Windows 95 will install and remove or add any components.

The Copying Files Phase

This phase of Setup is the most straightforward. After users have identified or confirmed which components Windows 95 should install, Setup begins copying files from the Windows 95 installation disks (or from a network server, if specified). When the

necessary files have been copied to the PC, Setup prompts users to remove any disks in floppy drives and then reboot the system to proceed with the final phase of Setup.

The Final System Configuration Phase

During the final system configuration phase, Setup upgrades the existing configuration of Windows and replaces the existing version of MS-DOS with the new Windows 95 operating system. After files are updated and the system is configured, Setup guides users through a process to configure peripheral devices, such as modems or printers, that are connected to the system. When this configuration is complete, Windows 95 is ready to use.

Better Control over Installed Components

Users now have greater control over components and parts of Windows 95 that are installed during the Setup process. Based on the modular architecture of Windows 95, users will be able to selectively choose the options that Windows 95 will install for the given functionality that they desire.

Setup's Smart Recovery Mechanism

During setup of Windows 3.1, if the system hung during device detection or if the setup process ended abnormally, a flag would be set disabling hardware detection for the next time that Setup was run. This mechanism provided a means for users to bypass a section of Setup that would otherwise fail. However, they were required to rerun the entire setup process and manually identify hardware devices.

Windows 95 supports a far better recovery mechanism in the case of Setup failure. During the setup process, Windows 95 creates and maintains a log as the setup operations are performed and the hardware devices are detected. If Setup fails—for example, because of a hang during hardware detection—the last entry in the Setup log identifies where the process was interrupted. To recover and resume, users simply rerun Setup. The Setup program recognizes that it was run before and begins from where it left off. In the case of a hang during a hardware detection procedure, the system actually bypasses the detection module where the hang occurred and allows users to manually select the correct device installed in or connected to the system.

Built-In Verification of System Files

Under Windows 3.1, if a component file was accidentally deleted or a system file was corrupted, users had no easy way to recover the given file. They needed either to use the Expand utility to recopy a known file or to completely reinstall Windows 3.1 to reinstate a lost file.

Windows 95 provides some flexible solutions to this problem. During the setup process (and during subsequent maintenance of the Windows 95 system), Windows 95 creates and maintains a log of the installed components. This information is used as part of Setup's smart recovery support and is also used to verify the integrity of installed components.

If users run Setup after Windows 95 is already installed, Setup asks them whether to reinstall Windows 95 or simply to verify installed components. If they want to verify installed components, Setup examines the setup log and runs through the setup process *without* copying all system components. Instead, it verifies the integrity of the files that

were installed during Setup against the files provided on the Windows 95 installation disks. If the integrity check fails because of either a missing or corrupted file on the Windows 95 computer, Setup automatically reinstalls the missing or corrupted file.

This capability in Windows 95 greatly simplifies and reduces the time required to resolve missing files or corrupted configurations, thereby helping to reduce the time and money required to support desktop configurations.

Network Setup Improvements

Windows 95 provides improved support for installation and use in network environments. Windows 95 can be installed on a network to upgrade existing Windows users, or it can be used to convert existing MS-DOS PCs. Windows 95 offers the same capabilities for running Windows from a network but also provides additional functionality to better address the requests of MIS organizations.

In addition to basic support for stand-alone computers, Windows 95 includes Setup provisions for better supporting the following:

- Installing and running Windows 95 from a local computer on a network
- Installing and running Windows 95 from a network server instead of installing it on the local computer
- Installing Windows 95 on a network server and supporting diskless computers that RIPL boot from the network server
- Installing Windows 95 on a network server and supporting computers with a single floppy drive that run Windows 95 from the network server

Additional information about network support in Windows 95 is given in Chapter 9, "Networking."

Network Installation Location Remembered

When users modify the configuration of their PCs in a networked environment, the Windows 95 Setup program makes the installation of new drivers easy by remembering the location on the network from which Windows 95 was installed. Any user that has been prompted for the insertion of a disk containing needed files for Windows or Windows for Workgroups will appreciate this new functionality. Whether the server is a NetWare server or a Windows NT server, when users add a device or require additional driver support files to properly run Windows 95, Setup automatically attempts to get the files from the network server. Setup stores a UNC pathname in the Registry, eliminating the need to maintain a permanent network connection on the PC.

Batch Installation Support

Windows 95 features a batch installation option that permits the use of an installation script to automate the installation process. MIS organizations or VARs can simplify the installation procedure for users by specifying answers to questions that Setup asks, as well as specifying defaults for installing and configuring devices such as printers.

System administrators can use the NetSetup tool provided with Windows 95 to create a batch script that specifies all of the options that Setup needs, thereby providing support

for hands-free installation. The batch installation capability of Windows 95 is more flexible and customizable than that provided with Windows 3.1 or Windows for Workgroups 3.11.

Windows and Windows for Workgroups Configuration Preserved

Windows 95 can easily be installed as an upgrade on a PC where Windows or Windows for Workgroups already exists. During the upgrade process, Windows 95 uses existing configuration information to set installation defaults and examines the contents of specific .INI files to further determine the appropriate Setup options.

Windows 95 preserves configuration information, such as the Program Group definitions created by the user, and maps user interface-related features or functionality from Windows 3.1 or Windows for Workgroups to that of the interface used by Windows 95.

