
Part 1 Initiatives

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Chapter 2 Easy PC Initiative

This chapter describes goals for the Easy PC Initiative and features that can be implemented to achieve these goals. The emphasis is on designs for consumer desktop systems, but most of the guidelines apply to mobile systems. Designers should use their judgment to implement the spirit of these recommendations, where applicable, for their specific system types. Some features build on the PC 2001 requirements; others indicate ways to add value beyond them. These recommendations are not PC 2001 requirements, except where citations point to specific requirements defined in Parts 2 and 3 of this design guide.

Easy PC Initiative Goals in 2000–2001

The Easy PC industry initiative, jointly announced by Intel and Microsoft in 1999, describes a shared vision for making the PC platform simpler, especially for new users, in order to grow the market and increase customer satisfaction.

The key goal for the Easy PC Initiative is to produce new PC designs that are easy to set up, easy to use, easy to expand, and easy to maintain. The Easy PC Initiative offers many recommendations for innovative system designs, architectural advances, and simple configurations that enable end users to benefit from new, exciting PCs that are reliable and easy to use. The industry will benefit from reduced support costs by removing configuration problems.

For additional information about the Easy PC Initiative and legacy-free design, see these Web sites:

- <http://developer.intel.com/technology/easeofuse/>
- <http://www.microsoft.com/hwdev/newpc/>

Easy to Set Up

Usability tests have found that the setup process for a new PC confuses first-time and nontechnical users. A goal for the Easy PC Initiative is to get the user from “PC in carton” to “PC in use” successfully and quickly. The out-of-box experience (OOBE) should be an easy, fast, and friendly experience that enables a novice user to set up a new Windows-based PC and begin using it without any outside assistance.

The Easy PC Initiative encourages the system manufacturer to completely preconfigure applications, connectivity, and other activities that have been shown to confuse first-time and nontechnical users. System builders are strongly encouraged to take advantage of Microsoft-provided tools for use with Windows operating systems to create streamlined installation routines, including integrated Internet signup and single-stop registration. The manufacturer can also customize and preconfigure dial-up connectivity.

Another goal for the Easy PC Initiative is to encourage system designers' efforts to introduce new, innovative industrial designs, including designs with smaller footprints. By limiting internal expansion to manufacturing customization, system designers can pursue alternative design options that deliver the benefits of higher functional integration.

For specific examples, see "Easy to Set Up Guidelines" later in this chapter.

Easy to Use

The PC is a powerful and sophisticated device that can be daunting to new users. A goal for the Easy PC Initiative is to maintain the PC's power and flexibility, while presenting the user with simple, intuitive access to system capabilities.

Beginning with the first display of the Windows desktop after the user completes the OOBE process, the hardware and software must immediately be usable. Common activities should be easy to find. Menu selections and desktop contents should be simple to avoid confusing the user. Messages and instructions should use nontechnical terms.

To make the PC more robust and reliable, the system designer should remove legacy hardware and software that are known to cause problems for users. Power management features should be fast and reliable. Networking should be automated. Configuration of preinstalled hardware and software helps ensure that the user has no reason to reboot the PC between sessions.

For specific examples, see "Easy to Use Guidelines" later in this chapter. See also Chapter 3, "PC System," for PC 2001 requirements that support this goal.

Easy to Expand

The PC is known for flexibility that allows expansion of its hardware, software, and networking capabilities. A goal for the Easy PC Initiative is to make it easy to add new features to the PC without compromising prior functionality. Expansion is provided using external, hot-pluggable connections such as USB, so the user does not have to open the PC case or shut down the system to add new capabilities. Where possible, the PC should be designed and preconfigured for anticipated expansion.

Another goal of the Easy PC Initiative is to encourage the home PC user to have ready access to high-speed communications and the Internet in the home. The system designer should integrate home networking connections. The system designer should also provide easy expansion for broadband technologies such as DSL and cable modems.

For specific examples that make it easier to set up a new PC and later to expand the PC's capabilities, see "Easy Expansion Guidelines" later in this chapter. See also Chapter 14, "Network Communications," for PC 2001 requirements that support this goal.

Easy to Maintain

PC users find system maintenance is a chore. A goal for the Easy PC Initiative is to encourage integrated, robust system designs that allow the system to automatically maintain and protect itself from problems that could be introduced over time. Maintenance problems can be introduced in many ways, including BIOS updates, driver updates, and viruses. The system designer should provide well-integrated backup, update, and virus protection capabilities that reliably update and protect the user's system.

In support of this goal, Microsoft has introduced capabilities in Windows Me and Windows 2000 that protect system files and allow easy restoration of system configuration. Microsoft supports automated driver and service updates through the Windows Update and Web-based technical support through the Microsoft PC Health Initiative.

For specific examples of ways to make PC maintenance easier, see "Easy to Maintain Guidelines" later in this chapter.

Legacy Removal and Easy PC Goals

Specific requirements for legacy removal are provided in Chapter 3 of the PC 2001 guide. This section explains the relationship of legacy removal to the Easy PC Initiative.

With the evolution of PC architecture, newer interfaces and approaches provide improved methods to integrate components and devices. "Legacy" components become candidates for obsolescence when new technologies reach appropriate cost points and functionality to benefit both users and the PC industry. Removing legacy components offers the opportunity to simplify the Windows-based platform, thereby enabling a more robust, easier-to-use system and allowing PC designers to reduce costs of both manufacturing and support. Users with the fewest existing dependencies on legacy components will be the earliest to adopt the new technologies.

From the PC manufacturer's perspective, achieving lower costs is crucial, and removing legacy connectors and controllers translates into lower product cost. Simplifying the interfaces behind which devices are added and removed from the PC also translates into reduced support cost.

From the user's perspective, newer interfaces such as USB provide greater flexibility, dramatically reducing configuration problems and the need for manual intervention or system reboots. Consequently, the user can add and use a greater number of device types based on a lesser variety of interfaces.

Of course, to encourage simple, dynamic capabilities to add and remove devices, removal of legacy interfaces must be accompanied by correct implementation of the newer interfaces. Therefore, achieving Easy PC goals means complying with the hardware, BIOS, and driver requirements as defined in the PC 2001 guidelines.

Performance improvement should be considered a secondary motivator for legacy input/output (I/O) removal. Many devices such as storage, graphics, and audio have already migrated onto the faster PCI and Accelerated Graphics Port (AGP) interfaces. As a consequence, end users might perceive only slight benefits to system performance. However, implementing devices on new buses can eliminate the performance drag of polling across legacy COM and LPT ports. Boot speed should also increase in systems that replace legacy code paths with new, properly designed architectures.

Chapter 3, "PC System," contains specific PC 2001 requirements for legacy-reduced and legacy-free systems.

Recommendations for Easy PC Configuration

This section recommends original equipment manufacturer (OEM) guidelines for system configuration to meet the goals of the Easy PC Initiative, with references to specific PC 2001 requirements that are related to some features in this chapter.

Easy to Set Up Guidelines

These "Easy to Set Up" guidelines define improvements to the OOB process. The goal is to make setting up and using a PC for the first time as easy, fast, and friendly as using any common, sophisticated consumer electronics device.

These guidelines result from usability tests that show experienced users take at least 30 minutes to set up a PC, and novice users take at least an hour and often need assistance at least once to complete the entire setup process.

All users should be able to set up a new PC system in less than 15 minutes without any outside assistance.

Innovative Form Factors

Instead of beige boxes, the OEM offers new innovative industrial designs that use an appealing consumer-oriented design language.

Packaging Guidelines

These guidelines help users to easily assemble the physical components of the PC system.

Boxes labeled with contents. The OEM clearly labels every OEM-supplied box with an icon or text describing what it contains: monitor, keyboard, main unit, and so on. In addition, all the boxes are numbered to indicate the order in which they need to be opened, and the box labeled Number 1 contains the setup map for the system.

Easy-to-follow pictorial setup instructions. The OEM provides a setup map with the PC that is placed in the package so that it is immediately visible when the user opens the box labeled Number 1. This setup map is simple enough that users with no prior computer experience can understand the instructions:

- It provides simple, step-by-step instructions, with illustrations describing how to set up the PC and any peripherals provided with the system.
- It shows the colors and icons for the cables and connectors so the user can easily match them. Color and icon recommendations are available on the PC Design Guide Web site listed in Appendix D, “Master Reference List.”
- It matches the pictures and text with the box numbers, appearance, and procedures for the specific PC model and does not include information about any other physical design.
- It provides instructions on how to use the on/off and sleep buttons.
- It includes the OEM’s technical support telephone number.

The OEM may also provide a separate video that shows the complete setup process from opening the boxes to the final Windows OOBE process and connecting to the Internet.

Easy to remove from packaging. The OEM provides a mechanism to assist with easy removal of the main unit and monitor from packaging. This assistance can include, but is not limited to, handles and straps, located on the unit or in the packaging, to facilitate removal from packaging.

For monitors and other heavy components that typically are tightly bound in foam packing, the OEM should provide mechanisms that help the user to remove these objects from their boxes, such as handles or the ability to slide systems and components out of the box. Also, the OEM should provide the user with an immediately visible explanation of how to easily unpack and move the component.

Simple cabling systems. For cables that connect peripherals to the main unit, no more than two cables, maximum, are needed for Web connectivity and home networking. For example, no additional external cable connects the home-networking card to the network adapter or modem.

If the system provides a built-in V.90 modem, DSL, and a HomePNA solution, the system has no more than two RJ-11 jacks with equivalent wiring.

Some possibilities to simplify cabling include:

- Use a single cable for the keyboard and to connect the mouse to the keyboard.
- Use a radio frequency (RF) wireless keyboard and mouse.
- If the monitor has a USB hub, integrated speakers, or both, provide a single cable for all connections other than power.
- Provide cables of the appropriate length. If that length cannot be determined, consider retraction mechanisms for long cables or extension cables for short cables.

USB keyboard port on PC has an icon. If the PC does not have an integrated keyboard, the PC has a USB port designated for the USB keyboard. This designation encourages users to attach the keyboard close to the system root hub, which helps reduce boot and resume times, thus improving system boot performance. To help guide users to this enhanced configuration, OEMs can label the appropriate port with an icon, include the labeled port on the setup map, and recommend that users plug the keyboard directly into this designated port. For recommendations about icon implementation, see the Icons for PCs Web page, listed in Appendix D.

Easy-to-access connectors. At a minimum, two high-power USB ports should be easily accessible to the desktop user—that is, placed on the front or side of the main unit, keyboard, or monitor. For mobile users, at least one high-power USB port should be available, and it can be located on the back of the machine. The goal for this guideline is to make connectors for hot-pluggable peripherals conveniently accessible to the user.

See SYS-0021, “PC 2001 system includes USB with two user-accessible USB ports, minimum,” in Chapter 3.

Streamline OOB process. To help users complete system setup as quickly and painlessly as possible, manufacturers should make the setup process straightforward. This streamlining includes:

- **Making sure all system setup occurs within the Windows OOB process.** Do not include subsequent setup programs or steps after the user goes through the initial setup process.
- **Prepopulation of user information during OOB.** The goal is to provide the quickest time and least confusion for users to get to the Windows desktop.

To achieve this goal, manufacturers set various parts of the registration information for users before they get their machines. For retail systems, OEMs should consider ways to allow easy population of user information at the store or purchase location, as well as prepopulating any regional information supported in their manufacturing processes.

- **Consolidated entry of user information.** Provide only a single registration, instead of asking the user multiple times for the same data.
- **No reboots during the OOBЕ process.** The system does not include any custom components that require reboot during the OOBЕ process.
- **No executable software is downloaded during the OOBЕ process.** No executable software downloads occur during the Windows OOBЕ process. All required software and options that the user can select are preinstalled on the system itself.
- **Minimize the number of internet service provider (ISP) offers presented to users.** Provide the user with clear choices on ISP offers by presenting and clearly describing a minimum number of ISP offers.
- **Enable hardware check.** Manufacturers should enable hardware diagnostic checks that determine whether components are functioning properly. Here are a few examples. The keyboard and mouse are plugged in (if USB), and the speakers are working. If a phone-line dial-up connection is to be used, a dial tone exists. On-screen troubleshooting help includes support contact information.

Easy to Use Guidelines

These “Easy to Use” guidelines define improvements that encourage immediate access to the common tasks for which the user bought the PC, with seamless system support for attaching and detaching network connections and peripherals at any time.

Ease of Use Software Interface Guidelines

These guidelines provide a foundation for an easy-to-use, attractive system.

Usability testing shows that the proliferation of choices provided by Microsoft and the OEM on the Windows Desktop can confuse and frustrate the user. The following recommended characteristics present users with a simple user interface that directs them to the actions they will most likely choose.

Minimize the number of preinstalled icons in the System Tray. To minimize the overhead associated with System Tray resident programs, and to avoid confusing the user, the System Tray should contain only the following permanent icons: an anti-virus icon, the Task Scheduler, a technical support icon, and any locale-specific utilities such as specific language input mechanisms. The System

Tray can also contain transitional icons that appear only when the system performs certain functions, such as printing, mail delivery, or battery/AC.

Minimize desktop, quick launch, and Start menu icons. Usability studies show that novice and typical users get confused and overwhelmed by too many choices and options with their computer. To reduce confusion, OEMs should minimize the number of choices and icons that users are exposed to when first logging on.

All software is preinstalled. All software provided with the system is preinstalled, instead of simply included on the system for the user to install later. As an alternative, the OEM can provide software with easy installation mechanisms, such as using auto-run or integrating with Add/Remove programs.

Hard disk configured for easy use. Whenever not constrained by specific applications, the hard disk should be configured to display to the user no more than one visible drive letter per physical drive. The capacity of the disk, as advertised, is the available capacity for the end user, as reported by the operating system. Both guidelines apply whether the hard disk is built into the system or offered as an add-on product.

The hard disk is formatted with FAT 32 or Windows NT® file system (NTFS) to provide the best capacity and to gain the related benefits of a single file system with a single drive letter per volume.

Web-based support and product offerings. The OEM presents information on a Web site to provide the following:

- Support information. This OEM support is provided using Windows PC Health or a similar OEM-defined mechanism.
- Software and hardware offerings that have been designed and tested for compatibility with the system.
- A link to Windows Update at <http://windowsupdate.microsoft.com>.
- Offerings for the following classes of external expansion devices: digital cameras, HomePNA adapters, printers, scanners, hard drives, 10base-T network adapters, DVD ROM if one is not included with system, and backup mechanisms implemented in hardware and software.

OEM help topics integrated with or linked to Windows help. OEM help topics are integrated or linked to the Windows Integrated Help Center. At a minimum, these help topics include:

- How to install and uninstall system-specific hardware and software. In particular, the help file explains how to expand system capabilities using USB and whatever other expansion capabilities that are provided on the system.
- How to maintain the physical unit, such as how to clean the mouse
- How to establish a network connection for the specific system
- A list of specific system components for which the OEM supports upgrades

All timed product offerings and schedules configured with the System Task Scheduler. Only Task Scheduler is configured to display automatic product and service offerings to the user. Each offering provides the user with the opportunity to cancel future notifications.

Nontechnical terms in messages and documentation. All messages configured by the OEM use nontechnical terms that assume no prior PC experience.

Ease of Use User Interface Hardware Guidelines

These guidelines define hardware mechanisms that help ensure that the user is presented with simple choices for common actions.

Internet and e-mail buttons in hardware. The system includes the following HID-compliant quick-launch buttons on the monitor, the keyboard, or another location where users can easily push a button for common tasks:

- Internet (or Home), launching the user's default browser
- E-mail, launching the user's default e-mail as specified in Internet options

Quick-launch buttons do not override any user-defined options.

All volume controls on the system are HID compliant. A volume control should be on the keyboard or some location that is easily accessible to the user. Volume controls use HID interfaces to stay synchronized with each other. Any analog volume or power controls on powered speakers are located behind the speaker units or otherwise out of the user's immediate view. USB HID-capable speakers do not have analog or power control.

For PC 2001 support of this feature, see AUD-0335, "USB audio meets USB specifications" in Chapter 11.

Availability of easy expansion mechanisms for network adapters. Home networking and broadband solutions are preinstalled or the components are offered by the OEM as an easy "no touch" upgrade. "No touch" upgrade means:

- The upgrade does not require opening the PC case to add components.
- The hardware is hot-pluggable, using an external expansion connection.
- The solution uses the existing home infrastructure for connectivity.
- All drivers for solutions available when the system ships are preinstalled on the system.
- If the system includes built-in home networking capabilities, the home networking solution is HomePNA.
- If the system can be configured as an Internet gateway, it should support wake on LAN capabilities for waking the system from S3 state.
- If the system is provided to the end user with built-in home networking and broadband, the user must be able to use both at the same time.

Appliance-like Operation Guidelines

Microsoft Windows operating systems have boot performance enhancements to speed the time from turning on or resuming the power until the user can begin working. The features in this section supplement these boot performance enhancements to help ensure that the PC is ready to use quickly, in the same way that consumer appliances are “instantly available.”

Fast system start-up. The PC system should correctly implement PC 2001 power management requirements and minimize start time for cold boot, resume from hibernate, and resume from suspend. Fast start-up can be optimized through the following performance enhancements:

- Reduced POST time
- Decreased hard-disk spin-up time, which is not dependent on BIOS and begins as soon as power is applied
- Minimized number of applications and utilities loaded during start-up
- Shortened load time for drivers and memory-resident utilities, including System Tray

Maximize system resources available after boot. The Resource Meter can measure resident memory items.

Silent sleep and low noise during system operation. The goal for minimum system noise should be:

- No noise during any supported sleep state. The system can periodically turn on the fan during a sleep mode to maintain a thermal envelope.
- Fan noise does not exceed 37 dB A-weighted, measured with sound pressure at user position during normal operation.

In Chapter 3, see SYS-0003, “Hardware design supports OnNow and Instantly Available PC initiatives,” for PC 2001 noise requirements that support this goal.

Power Button Guidelines

Current PC designs often present multiple “power button” choices. Usability research shows significant customer confusion about what each button actually does and the reasons to push various buttons. Usability testing also shows that some users mistake the monitor power button as the universal power button for both the PC and the monitor.

These guidelines address issues that users have with the power control interface.

One ACPI-compliant on/off button on the main unit. The system includes a single on/off button on the main unit that meets the guidelines defined for the power button in ACPI 1.0b and *PC 2001 System Design Guide*.

The on/off button on the main system unit is configured to place the system in the S4 (hibernate) state, rather than in the S5 (off) state. The main unit has no sleep button. The on/off button has an indicator light associated with it, either in the button itself or adjacent to it.

If the main unit includes a separate physical hard power switch (as required in some locales), it is placed on the back of the unit.

The on/off button should be located away from any media-eject buttons to prevent user confusion or accidental actions.

See SYS-0003.3, “System provides software-controlled, ACPI-based power switch,” in Chapter 3, for applicable PC 2001 ACPI requirements.

Nonintegrated keyboard includes a sleep/wake button. A sleep button is located on the keyboard and is configured to place the system in the S1 or S3 sleep state or to wake the system from sleep. At a minimum, the button is labeled with a sleep icon.

Hardware indicator changes appearance to show the power state. One or more visual indicators on the main unit show whether the system is in the working, sleep, or hibernate (off) state. The indicator remains lit but changes color when the system is in the sleep state; when the system is in a hibernate or off state, the indicator light is off.

See SYS-0003.2, “System provides one or more indicators to show whether the system is in the working or sleep state” in Chapter 3, for PC 2001 power state indicator requirements.

User instructions for controlling system power. The goal is to educate users on orderly system shutdown. The OEM provides the user with clear directions for using the on/off and sleep buttons. The instructions clearly indicate that these buttons are the power controls, and they specifically instruct users never to shut off the system from a power strip control.

Easy Expansion Guidelines

These “Easy Expansion” guidelines define improvements that help the user to easily add peripherals and software to the system.

Basic Expansion of Hardware and Driver Guidelines

Following these guidelines helps to provide a trouble-free experience during system expansion.

Legacy-free design. The system meets the criteria for legacy-free design, as defined in *PC 2001 System Design Guide*. For specific details of this system

design criteria, see “PC 2001 Legacy-Free System Requirements” and design notes in “PC System References” both in Chapter 3.

No user access to internal parts. All user-accessible expansion capabilities are external. User-accessible memory expansion is discouraged in the same manner.

The system can have internal PCI, AGP, or memory slots to allow the manufacturer in the factory or the distributor to configure the system. However, these slots should not have quick-access mechanisms, and they should not be promoted as end-user expandable. If internal expansion or memory expansion is available, dealer or manufacturer service is available to perform the expansion.

Two or more high-power USB ports available for expansion. A desktop system has two high-power USB ports that are free after the keyboard, mouse, communications, and networking devices are connected to the system. Mobile systems should have at least one free high-power USB port.

For PC 2001 guidelines that support this feature, see SYS-0021, “PC 2001 system includes USB with two user-accessible USB ports, minimum” in Chapter 3.

USB 2.0 or IEEE 1394 port. The system includes USB 2.0, IEEE 1394, or both to support external high-speed peripherals for video, mass storage, and backup.

Only hot-pluggable external connectors. All external digital and analog connectors, with the exception of the VGA connector, completely support hot plugging and removal while the PC is running.

Color-coded connectors with icons. For the PC system itself, and for all peripherals included with the system or offered by the OEM, the connectors or the overlay around connectors implement the icon and color-coding schemes that are provided on the Icons for PCs Web page listed in Appendix D, “Master Reference List.” The icon also appears on the shroud for the device connector, and the icons match between the main unit and connector shroud. Mobile units can choose not to include color coding for aesthetic reasons and can wrap icons underneath the unit, if there are space-constraint issues. Multiple audio jacks are all color-coded if they are provided and adjacent to each other. Speaker, microphone, and line-out jacks are color-coded and use standard icons. The headphone jack does not need to be color-coded if it is not on the back of unit, but the jack does need to use the industry-standard headphone jack icon. Headphone jacks located on CD or DVD drives do not need to use icons or color coding.

Easy access to drivers for all hardware components. For easy future installation of hardware components, the OEM provides drivers that are easily accessible to end users. Locations for these drivers should include:

- Recovery CD
- OEM Web site
- Windows Update Web site

INF files prepopulated for all devices offered. Entries for all OEM-offered devices are prepopulated in the INF files preinstalled on the system. This guideline includes entries for all keyboards in Keyboard.inf, all mice in Msmouse.inf, and other pointing-device INFs.

Guidelines for OEM-Offered Components

These guidelines apply to additional drivers, utilities, and application software offered by OEMs.

Software and hardware components do not require system reboots. The OEM should not offer hardware or software components that require the system to be rebooted during installation or configuration. Reboots are allowed for networking-related hardware and software components.

Only Win32®-based software and utilities ship with system. All software updates and additional utilities offered by the OEM through any distribution mechanism are Win32-based software. The software does not require MS-DOS-based decompression or installers. This restriction does not apply to OEM diagnostic utilities or the emergency recovery software provided with the system.

For applicable PC 2001 guidelines, see SYS-0042, “Preinstalled components and upgrades do not require MS-DOS or legacy interfaces,” in Chapter 3.

Peripheral devices that are offered follow PC 2001 general device requirements. All peripheral devices offered as additional products meet the requirements in “PC 2001 General Device Requirements” in Chapter 3.

Offered software follows Windows-based application guidelines. All software that is preinstalled or offered to users—including utilities and components included with hardware peripherals—follows the guidelines that apply for the Windows 98 operating system, as defined in *Application Specification for Microsoft Windows 2000, for desktop applications, Version 1.0a* or later, listed in Appendix D.

Offered software does not interfere with other installation. Preinstalled software or software offered to the user by the manufacturer, such as anti-virus or compression programs, does not interfere with installation of new hardware or software.

Easy to Maintain Guidelines

These “Easy to Maintain” guidelines define improvements to ensure that system functionality and performance are maintained over time.

Basic Maintenance Guidelines

These guidelines encourage protection of key system functionality.

System File Protection enabled. The Windows System File Protection feature is enabled by default when the system is delivered to the user.

System Restore capabilities enabled. The Windows System Restore feature or a similar third-party restore mechanism is enabled by default when the system is delivered to the user.

Automated maintenance preconfigured. The OEM uses Windows Task Scheduler to automatically configure maintenance activities. The following maintenance services are **preconfigured** to run automatically, using defaults as shipped in the operating system:

- Disk cleanup—remove temp files and so on. Disk cleanup is configured by default *not* to empty the recycle bin.
- ScanDisk, disk defragmentation, and Auto-update.

Optionally, Backup can be scheduled to run automatically.

Easy System Update Guidelines

These guidelines support improved update functionality.

Automatic critical update notification enabled. The OEM enables automatic critical update notification and installation, using Windows Update or the OEM’s update site to deliver both notification and installation.

Self-extracting critical fixes provided. Critical fixes to system components are provided as self-extracting, self-installing executables and are installed as automatic updates.