

## 2.2.7 Windows Activation Facts

Microsoft requires that you activate newly installed Windows systems before you can use them. Product activation confirms that the installed copy of Windows has been properly licensed. Product activation is typically performed automatically over the Internet, although you can call Microsoft to manually activate a system if necessary. If you activate Windows over the Internet, the system contacts Microsoft online to verify its product key. If the Windows product key is valid, then the system is validated. However, if the product key isn't valid, the Windows installation is branded as non-genuine and various notifications are displayed to remind the user to activate Windows.

The following steps compose the activation process:

1. During the Windows installatin, two unique identifiers are created for the system:
  - A unique product ID (PID) is created using the product key that you entered during the installation process.
  - Based on the system hardware, a unique hardware ID (HWID) is created. Every hardware component in the system has a unique serial number assigned to it. During installation, Windows runs a mathematical formula against each device's serial number to create a one-way hash for each component. Then four to ten bits are extracted from each device's hash to generate an eight-bit HWID that uniquely identifies the system.
2. Windows contacts Microsoft through the Internet and sends a handshake request containing:
  - Your system's PID.
  - Your system's HWID.
  - The version number of the activation software running on the system.
  - A unique request ID number that is associated with the specific system.
3. Microsoft verifies that the license associated with the PID allows system activation.
4. If activation is allowed, Microsoft associates the PID with the system's HWID. This prevents the same product key from being reused to activate Windows on a different system.
5. A confirmation is sent back to the system in the form of a digital certificate signed by Microsoft, indicating that the system has been successfully activated.

Thereafter, the system's HWID is recalculated every time the system is booted. The recalculated HWID is compared to the HWID used to originally activate the system. If the HWID hasn't changed substantially, then the system remains activated. However, if the HWID has changed substantially, then the system will deactivate, and you must reactivate it. This ensures that the activated copy of Windows is still running on the same physical hardware.

Any change to the system hardware will cause its HWID to change. For example, if you were to remove the system's DVD drive and replace it with a Blu-ray drive, the HWID will change. Fortunately, the hardware in the system must change significantly before the system will become deactivated. Some system hardware is weighted more heavily when calculating the HWID. For example, the network card is weighted more heavily than any other component. As long as the same NIC remains in the system, at least six other hardware components can change before reactivation is required. However, if you install a new NIC in the system, then you can only change two other hardware devices in the system without reactivating. If you change a third device, reactivation will be required.

As long as the original hardware used to calculate the HWID remains in the system, you can add new components without requiring reactivation. For example, you can add a new hard disk drive to the system, and it won't affect the activation status.

Several Windows activation mechanisms are available. The mechanism you choose depends up on the distribution channel used to purchase Windows:

Distribution Channel	Activation Considerations
Full-packaged (Retail)	Retail copies of Windows must be activated over the Internet or by calling Microsoft after the installation is complete.
Preinstalled (OEM)	Because they are preinstalled, OEM copies of Windows are usually activated by the system manufacturer.
Volume Licensed	<p>Windows systems installed under a volume license agreement can take advantage of volume activation. Windows systems in a large network are commonly installed using a generic volume license key (GVLK). This allows you to use the same key to license multiple systems until you reach the number allowed by your license agreement.</p> <p>Volume activation automates the activation process, making it easier to deploy a large number of Windows systems. You can implement volume activation in two ways:</p> <ul style="list-style-type: none"><li>▪ <b>Activation through Key Management Service (KMS)</b> allows you to activate Windows systems using an internally hosted KMS service. KMS activations are valid for 180 days. To remain activated, each system must renew its activation by connecting to the KMS host at least once every 180 days. By default, KMS client computers attempt to renew their activation every seven days.</li><li>▪ <b>Activation through Microsoft Active Directory</b> allows Windows systems connected to the domain to activate automatically during computer startup. Windows stays activated as long as it remains a member of the domain.</li></ul>

You can use the Windows Software Licensing Management utility (slmgr.vbs) to manage activation from the command line. Enter **slmgr** with the appropriate options at an administrator-level command prompt:

- **/ipk *product\_key*** installs a product key.
- **/ato** activates Windows.
- **/dli** displays summary license information.
- **/dlv** displays detailed license information.
- **/xpr** displays license expiration date.