What is Modern Standby

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Windows 10 Modern Standby (Modern Standby) expands the Windows 8.1 Connected Standby power model. Connected Standby, and consequently Modern Standby, enable an instant on / instant off user experience, similar to smartphone power models. Just like the phone, the S0 low power idle model enables the system to stay connected to the network while in a low power mode.

Although Modern Standby enables an instant on/off user experience like Connected Standby, Modern Standby is more inclusive than the Windows 8.1 Connected Standby power model. Modern Standby allows for market segments previously limited to the Traditional Sleep (S3) power model to take advantage of the low power idle model. Example systems include systems based on rotational media and hybrid media (for example, SSD + HDD or SSHD) and/or a NIC that doesn't support all of the prior requirements for Connected Standby.

The number of systems supporting Modern Standby rather than S3 is increasing over time. The Modern Standby section outlines important changes, partner requirements, and best practices for enabling Modern Standby.

> **Note**
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> Modern Standby is available for both Windows 10 desktop and Windows 10X.
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> Switching between S3 and Modern Standby cannot be done by changing a setting in the BIOS. Switching the power model is not supported in Windows without a complete OS re-install.

Functional Overview of Modern Standby

A Modern Standby session encompasses the entire screen-off to screen-on user scenario. However, individual *screen off* and *sleep* segments make up an overall Modern Standby session. These states differentiate periods of quiescing software behavior from periods of long term low power. For this reason, Microsoft conceptualizes modern sleep as equivalent to traditional S3 sleep, with the added benefit of allowing value-added software activities to run periodically.

In Windows 10, low power is achieved by only waking from the lowest power state when absolutely necessary and only allowing software to execute in short, controlled bursts of activity, dramatically reducing the opportunities for software components to execute. Windows and the SoC hardware are always listening for interesting events (such as a network packet or user input at a keyboard) and will wake up instantly when needed. The system will wake when there is real time action required, such as for OS maintenance or when a user wakes the system.

Modern Standby consists of multiple hardware and software power modes, all of which occur with the screen turned off. The complexity of Modern Standby is a result of keeping the system alive to process background tasks, while ensuring that the system stays quiet enough to achieve long battery life.

Entry to Modern Standby

Modern Standby starts when the user causes the system to enter sleep (e.g user pressing the power button, closing the lid, idling out, or selecting Sleep from the power button in the Windows Start menu). On entry to Modern Standby, apps and system software must be made ready for the transition to low-power operation. (See Prepare software for Modern Standby.) After software components and apps have been prepared for low-power operation, hardware components, including their software device drivers, must be similarly prepared for low-power operation. (See Prepare hardware for Modern Standby.) **Both software and hardware must be made ready for low-power operation.**

Activity during Modern Standby

On-demand transitions to active mode can occur in response to user inputs, interrupts from networking devices and other hardware events. Windows transitions the SoC from active mode to idle mode after all software activity is stopped and the devices on and off the SoC have entered low-power states. (See Transitioning between active and idle states.)

The networking and communications devices automatically transition between active and low-power modes based on the software activity of the system during Modern Standby. When there are no system services or Microsoft Store app background tasks that require the network, the networking device is in the low-power, protocol offload, and WoL patterns mode. When a system service or background task requires network access, Windows automatically transitions the networking device to an active mode.

On occasion, the system stays in the active mode (with the screen off) for a longer interval of time. These longer active intervals occur for a variety of reasons, for example, processing incoming email or downloading critical Windows updates. Windows components that are allowed to leave the SoC in the active power state are called activators because they are registered with the power manager as capable of blocking the transition back to the idle power mode. The durations of these activities vary widely but are controlled to extend battery life. The durations of the activities can be viewed with the built-in SleepStudy software tool or through Event Tracing for Windows (ETW)-based instrumentation.

On Windows 8.1 Connected Standby systems, during Modern Standby, Windows transitions the SoC from idle mode to active mode a minimum of every 30 seconds to perform kernel maintenance tasks. This maintenance activity is extremely brief in duration (typically no more than a few hundred milliseconds) and cannot be adjusted. This does not happen on Windows 10 Modern Standby systems.

Resume from Modern Standby

When the user causes the system to resume from standby, e.g. presses the power button, the display is immediately turned on and networking devices are restored to their normal, active operating modes. The time from the power button press to the display turning on is less than one second. After the display is turned on and the networking device returns to normal operating mode, desktop applications resume and the system returns to its normal, screen-on active behavior.

Related Articles

- Modern Standby vs S3
- Modern Standby key concepts overview
- Modern Standby states
- Prepare hardware for modern standby
- Prepare software for modern standby
- Activators
- SleepStudy

Additional resources

Training

Module
Troubleshoot Windows startup - Training

This module examines the Windows startup architecture and discusses the methods used to troubleshoot client startup issues.