

# Intel BKC – PPM Package

## What? Why? How?

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## 1. What is Processor Power Management (PPM) Package

Windows\* 10 OS provides support for IHVs (Independent Hardware Vendors, such as Intel®) to customize and tune PPM (Processor Power Management) behavior on their platforms for optimal energy efficiency and performance. This support is provided by a new PPM Package that includes a number of PPM settings, including controls for adjusting processor frequency and idle state transitions.

The PPM Package is installed on top of Windows 10 OS to become part of the OEM Windows 10 image, similar to a driver package. See Section 3 for the full description.

The PPM Package contains multiple profiles for typical scenarios:

- Default – default OS PPM tunings (active most of the time)
- Low Latency – used during boot or application startup
- Low Power – used during phases of media applications, such as audio or video playback
- Constrained – used when the battery is low

Each power profile contains two settings: AC mode and battery mode. For new platforms, the PPM settings are included for the Default profile only. It is up to the IHV to set the values of the other profiles, and optionally set more optimal values for the Default profile as well.

Intel® uses this Windows 10 capability to provide customized PPM policy settings to OEMs via the PPM Package that is included in the Intel BKC (Best Known Configuration).

## 2. Why? What's the benefit of installing this package

Installing the PPM Package enables you to benefit from platform specific customized tunings, including support for the latest PPM features available in recent processors, such as Intel® Speed Shift Technology, previously called Hardware-Controlled Performance States (HWP).

The PPM Package supplied with the Intel BKC changes Windows 10 behavior from setting the processor P-States on its own to the OS delegating the P-States selection to the processor itself. Intel has tested this mode for over 2 years and together with Microsoft\* has reached the conclusion that the end result of this new mode is superior performance at negligible power cost, if at all, especially in responsiveness scenarios. Intel has measured up to 1.6x faster response for short interactions (under 1 sec) under these PPM settings.

## 3. How to inject/apply the PPM package into a Windows 10 OS system

In order to measure the benefit of the PPM Package, OEMs normally measure the performance and power consumption of their workloads of interest without and with the package installed.

You can use DISM to inject PPM package into a Windows 10 image, or apply the package to a running Windows 10 system using the below steps.

- a) Run the <platform>.ppkg file
- b) Wait a minute
- c) Restart

## 4. Configuring Windows 10 OS for Power/Performance Measurements

Below are a few OS configuration options that reduce results variance and help avoid measurement errors due to unexpected activity on the target machine.

**Please make sure to use these configuration options for benchmarking only, not for systems shipped to customers.**

- a. Disable Google\* Chrome\* update
  - i. Download the Administrative Template from here:  
<http://dl.google.com/update2/enterprise/GoogleUpdate.adm>
  - ii. **Start > Run > gpedit.msc**
  - iii. Under **computer configuration**, right click the **Administrative Templates** and click **add**.
  - iv. Select the downloaded file, this will add **Classic Administrative Templates**.
  - v. Go to **Classic Administrative Templates > Google > Chrome**.
  - vi. In Google Chrome, select **Update policy override**, select **enabled** and then, from the list below, select **disable updates**.
  - vii. Do the same for **Chrome Binaries**, **Chrome Canary Build** and **Chrome Frame**.
  - viii. You can find more explanations at: <https://support.google.com/installer/answer/146164?hl=en>
  - ix. Create a backup and remove GoogleUpdate.exe from:  
C:\Program Files (x86)\Google\Update
- b. Disable Windows Update
  - i. Go to services, find the **Windows Update** service
  - ii. Stop the service and disable it
- c. Disable OneDrive\*
  - i. At the notification area (right bottom corner), locate the **OneDrive** icon.
  - ii. Right click on it and select **settings**.
  - iii. In the setting tab, uncheck the **Start OneDrive automatically...** option.

- d. Disable Sleep and turn off monitors on all power schemes via Power Options
- e. Turn off Windows Firewall
  - i. Go to **Control Panel > Windows Firewall** and turn **Windows Firewall** off
  - ii. Turn off for public and private networks
- f. Disable Windows Defender\* via Group Policy
  - i. **Start > Run > gpedit.msc**
  - ii. Go to Computer Configuration/Administrative Templates/Windows Components/Windows Defender
  - iii. Select **Turn Off Windows Defender**
  - iv. Configure it to enabled
  - v. Restart the system?
- g. Limit Recycle Bin to 50MB
- h. Disable Cortana\*
  - i. **Start > Cortana & Search** settings
  - ii. Click **Not interested**, then click **I'm sure**.
  - iii. Set **Cortana** and **Search online and include web results** to off.

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