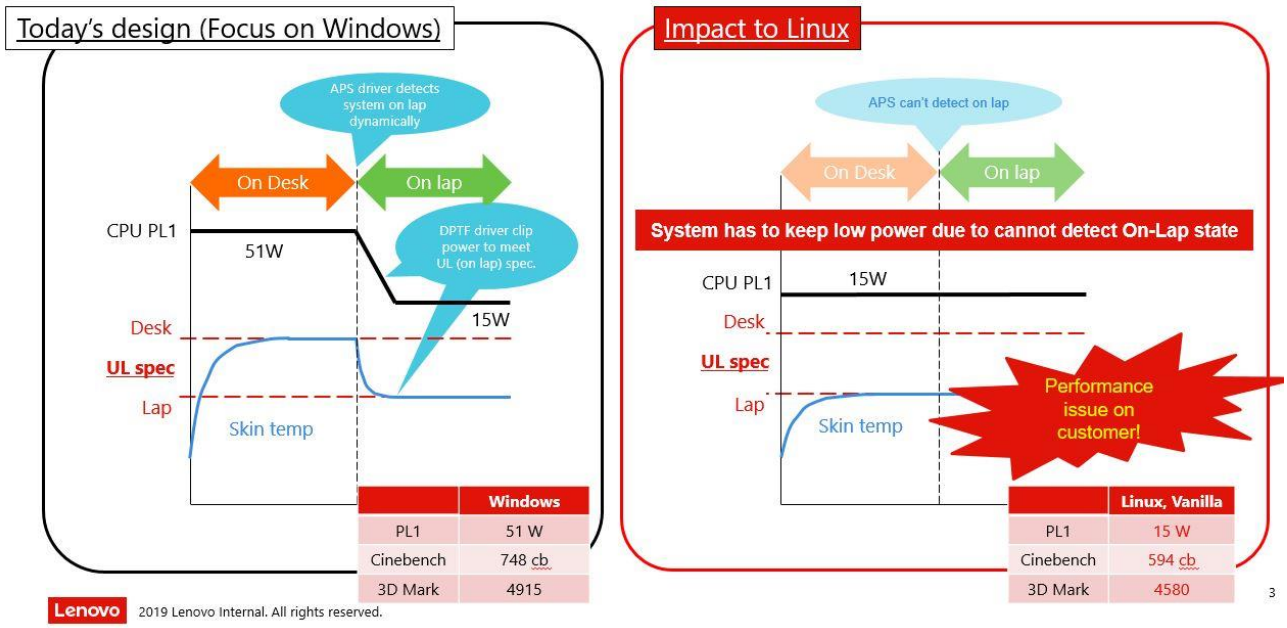
Linux Thermal Throttling

Introduction

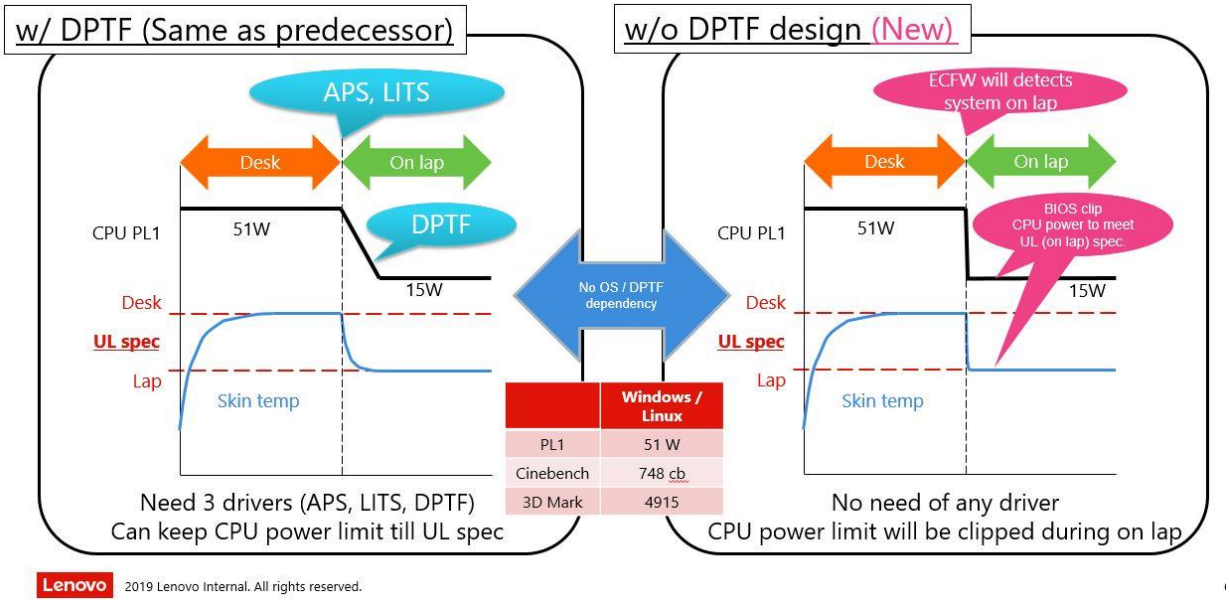
Some newer Lenovo laptop systems when running Linux are showing thermal throttling giving reduced performance compared to running with Windows

This is related to the closed-source DPTF settings from Intel that are not supported on Linux - Linux based systems cannot use these settings to determine if the device is “on desk” or “on lap”. UL specifications require that the temperature must be at a lower setting when a device is used “on lap”, as a safety precaution. This setting becomes the default when running Linux leading to earlier thermal throttling and degraded CPU performance.



Solution

Lenovo’s firmware team have designed and implemented an improved and smarter firmware design that is OS agnostic. The new firmware is able to directly monitor the system sensors to determine how the system is being used and control the temperature appropriately. Extensive simulation has been performed to ensure the system mimics the behavior seen with Windows using DPTF.



The firmware will continue to work with DPTF for Windows but now provides identical thermal and power performance under Linux

Frequently Asked Questions

- Is this compatible with thermald?
  This implementation operates independently of thermald. We don't foresee any issues using both this and thermald going forward but thermald will not be needed in the majority of cases.

- How is the firmware going to get updated?
  We will be releasing the firmware updates via LVFS. Manual updates for Linux will be available and automatic updates for Windows (via think vantage). Future laptops will have this new design preinstalled.
  Firmware for the X1 Carbon G7 will be released very soon

- Is Intel aware of this plan?
  Yes.

- Which platforms will this be released for?
  This will be implemented on all future platforms.
  We are releasing this initially on the X1 Carbon Gen7. Other platforms will be updated as we are able to address them