March 2021

USER EXPERIENCE IMPROVEMENT AFTER OOBE

HP INC

User experience improvement after OOBE

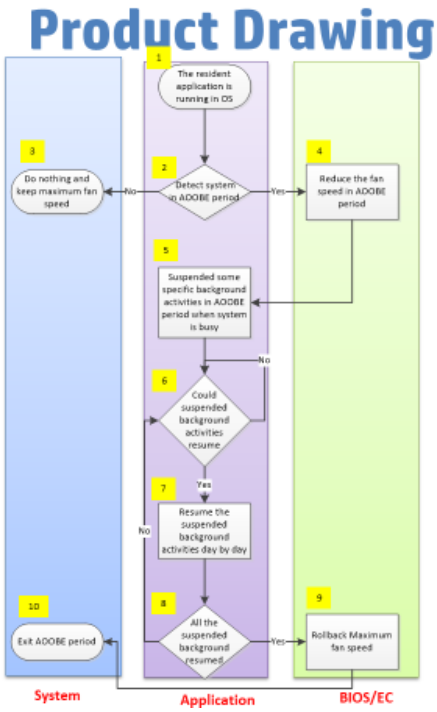
Abstract:

The system is busy after the Out-of-box experience (OOBE). For example, windows update, mail download, search Index create, antivirus and so on. The fan noise and skin temperature will be high easily because the system is busy above activities in a few days (we define this period after the OOBE, as AOOBE period). Some activities are background processes. User may not aware the system is busy by these processes. The user experience is bad for the fan noise, skin temperature and system performance during AOOBE period. We provide a method to improve user experience during the AOOBE period. We can detect the system is in the AOOBE period and then control fan speed and suspend background processes are not “must do” process when system is busy in the AOOBE period. The suspend background processes will be resumed when system is idle. It can improve user experience for fan noise, skin temperature and system performance

Design Construction:

- HW: No addition hardware design.
- SW: The **resident** application is running in OS for AOOBE period detection. The application will let background process suspend and resume automatically. It will also notify the EC to limit the fan speed during the AOOBE period.
- BIOS/EC: Limit fan speed during AOOBE period and fan speed is changed to normal after AOOBE exit.

< Flow Chart and Block Flow Diagram >



Step1: Application : The **resident** application is running in OS.
Step2: Application Detect system in AOOBE period. We expect the AOOBE period starts when the resident application is running first time in OS. The application will check some specific background processes to detect the AOOBE period and save the status to exit AOOBE period.

Yes, goto Step4. No, goto step3

Step3: System Do nothing and keep maximum fan speed. We only do specific fan and processes control in AOOBE period for user experience improvement.

Step4: BIOS/EC : Reduce the fan speed in AOOBE period because the fan speed is maximum speed easily in A AOOBE period. It can improve user experience.

Step5: Application : Suspended some specific background activities in AOOBE period when system is busy. You can see the examples in next page.

Step6: Application : Could suspended background activities resume. Will start to resume the suspended background processes when the CPU utilization is low. You can see the examples in next page.

Yes, goto Step7. No, goto step6

Step7: Application : Resume the suspended background activities day by day. Monitor the CPU utilization for previous resumed process. Start to resume another suspended process when the CPU utilization is low for the resumed process. You can see the examples in next page.

Step8: Application : All the suspended background resumed. Continuous to check the CPU utilization status and resume suspended process day by day until all the suspended background resumed.

Yes, goto Step9. No, goto step6

Step9: BIOS/EC : Rollback Maximum fan speed. The fan speed can keep the maximum after exit AOOBE period

Step10: System: Exit AOOBE period. No user impact after exit AOOBE period.

Product Drawing

You can see the examples as below table, The system just OOBE on 1/1. The fan speed will be reduced in AOOBE period. There are 4 processes (OUTLOOK, MsMpEng, searchindexer, svchost) are busy in the AOOBE period and it is normal behavior in Windows. The outlook is not background process, so that we can't suspend it when system is busy. We will suspend another 3 background processes and let system focus on the outlook for mail download. We can monitor CPU utilization for outlook. We identify mail download is completed on 1/3 when CPU utilization for outlook is low to 1%. We resume the suspended process MsMpEng on 1/4 and monitor the CPU utilization for MsMpEng. The virus scan is completed on 1/4. We resume the searchindexer for search index creation on 1/5 and it is completed on 1/6. Finally, we resume process svchost for Microsoft windows update on 1/7 and it is completed on 1/9. The CPU utilization can keep low when system is idle and no background processes is busy. We expect the Windows complete OS setup in AOOBE period. We can set fan speed back to maximum speed and doesn't suspend any process when AOOBE period is finished. We can improve the user experience in AOOBE period and no user impact after AOOBE is finished..

Process Name	Busy Functions	Can be Suspended (background processes)	Suspended duration	Resume date	busy duration after resume
OUTLOOK.EXE	Microsoft Outlook **for mail download**	No	N/A	No	1/1~1/3
MsMpEng.exe	Microsoft Antivirus software **for virus scan**	Yes	1/1~1/3	1/4	1/4
searchindexer.exe	Microsoft windows search Index for **search index creation**	Yes	1/1~1/4	1/5	1/5~1/6
svchost.exe, TiWorker, MoUsoCoreWorker.exe	Microsoft windows update **for windows update download and install**	Yes	1/1~1/6	1/7	1/7~1/9

	With specific fan control in AOOBE period.	Keep maximum fan after AOOBE period is finished
Maximum fan speed	7900RPM	9000RPM
Maximum fan noise	35dBA	40dBA

Business Strategy/Advantages

- The fan speed is reduced in AOOBE. The background processes are suspended automatically. The User impact is low because these suspended processes are not “must do” process. The system performance can focus on the user’s application. It can improve user experience for noise and performance in AOOBE.
- The suspended processes are resumed automatically day by day in AOOBE period. The fan speed keeps maximum speed after AOOBE period. No user impact after AOOBE period is finished.
- No addition hardware design and easy to implement in current PC system.

.

Disclosed by Rich Hsia, EK Chiang, Patrick Chen, HP Inc.