**# Title:**

Clarify Boot#### processing requirements

**# Status:**

Draft

**# Document:**

UEFI Specification 2.9 (Future Errata)

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**# Summary of the change**

Clarify the specification requirements around processing Boot#### variables, and how that relates to the different required events.

**# Benefits of the change**

Per UEFI v2.9:

Section 3.1.7 - Required System Preparation Applications

*"After all SysPrep#### variables have been launched and exited, the platform shall notify EFI\_EVENT\_GROUP\_READY\_TO\_BOOT and EFI\_EVENT\_GROUP\_AFTER\_READY\_TO\_BOOT event groups and begin to evaluate Boot#### variables with Attributes set to LOAD\_OPTION\_CATEGORY\_BOOT according to the order defined by BootOrder. The FilePathList of variables marked LOAD\_OPTION\_CATEGORY\_BOOT shall not be evaluated prior to the completion of EFI\_EVENT\_GROUP\_AFTER\_READY\_TO\_BOOT event group processing."*

A clarification is needed on what is meant by "...shall not be evaluated..." in section 3.1.7 above. There is misunderstanding of the spec that is causing implementation issues (including possibly not being compliant to the spec).

The straightforward interpretation is that this sentence indicates that EFI\_EVENT\_GROUP\_READY\_TO\_BOOT and EFI\_EVENT\_GROUP\_AFTER\_READY\_TO\_BOOT \*MUST\* be signaled and completed \*BEFORE\* any variables with LOAD\_OPTION\_CATEGORY\_BOOT are processed in any form. In other words, the order is X 🡪 Y 🡪 Z

X = Process all SysPrep#### variables

Y = Send an EFI\_EVENT\_GROUP\_READY\_TO\_BOOT event group to every option that can receive it and wait for it to complete

Z = Process ("evaluate") Boot#### variables.

The language in 3.1.7 is a prescriptive language that is stronger than the language in section 7.1 which defines the ReadyToBoot event group in a general way:  
  
*“EFI\_EVENT\_GROUP\_READY\_TO\_BOOT: This event group is notified by the system right before notifying EFI\_EVENT\_GROUP\_AFTER\_READY\_TO\_BOOT event group when the Boot Manager is about to load and execute a boot option. The event group presents the last chance to modify device or system configuration prior to passing control to a boot option.*

*EFI\_EVENT\_GROUP\_AFTER\_READY\_TO\_BOOT: This event group is notified by the system immediately after notifying EFI\_EVENT\_GROUP\_READY\_TO\_BOOT event group when the Boot Manager is about to load and execute a boot option. The event group presents the last chance to survey device or system configuration prior to passing control to a boot option.”*

However, the current TianoCore EDK2 UefiBootManagerLib's BmBoot.c has EfiSignalEventReadyToBoot() called during Boot#### variables evaluation (https://github.com/tianocore/edk2/blob/a56af23f066e2816c67b7c6e64de7ddefcd70780/MdeModulePkg/Library/UefiBootManagerLib/BmBoot.c#L1792-L1845), which is already a breach of the specs in terms of expected chronology, as it will force Z to start before the completion of Y. Furthermore, it is only ever called there, which is a second breach of the specs.

Specially, this leaves EFI\_EVENT\_GROUP\_READY\_TO\_BOOT not being signaled when other boot options, such as Platform Recovery, are being used, and this non-compliance to specs creates real issues on platforms such as the Raspberry Pi and other platforms that depend on the open source BDS in TianoCore.

For in-depth details of the issue and discussion, see:

* Code issue: <https://bugzilla.tianocore.org/show_bug.cgi?id=2831> (especially [comment 6](https://bugzilla.tianocore.org/show_bug.cgi?id=2831#c6) and [comment 11](https://bugzilla.tianocore.org/show_bug.cgi?id=2831#c11))
* EDK2 RPi patch and discussion thread: <https://edk2.groups.io/g/devel/topic/74912987#61328>

**# Impact of the change**

Change to TianoCore EDK2 BDS is needed to fix the flow, and the issues / side-effects highlighted in the BZ above.

**# Detailed description of the change [normative updates]**

* Insertions in **green**
* Removals in ~~red~~

**3.1.7 - Required System Preparation Applications**

…

After all SysPrep#### variables have been launched and exited, the platform shall notify EFI\_EVENT\_GROUP\_READY\_TO\_BOOT and EFI\_EVENT\_GROUP\_AFTER\_READY\_TO\_BOOT event groups **~~and.~~** Next, the platform shall begin to evaluate Boot#### variables with Attributes set to LOAD\_OPTION\_CATEGORY\_BOOT according to the order defined by BootOrder. The FilePathList of variables marked LOAD\_OPTION\_CATEGORY\_BOOT shall not be processed or evaluated prior to the completion of EFI\_EVENT\_GROUP\_AFTER\_READY\_TO\_BOOT event group processing."

**7.1 Event, Timer, and Task Priority Services**

…

**EFI\_BOOT\_SERVICES.CreateEventEx()**

…

**EFI\_EVENT\_GROUP\_READY\_TO\_BOOT**

This event group is notified by the system right before notifying **EFI\_EVENT\_GROUP\_AFTER\_READY\_TO\_BOOT** event group ~~when~~ and before the Boot Manager is about to load and execute a boot option. The event group presents the last chance to modify device or system configuration prior to passing control to a boot option.

**EFI\_EVENT\_GROUP\_AFTER\_READY\_TO\_BOOT**

This event group is notified by the system immediately after notifying **EFI\_EVENT\_GROUP\_READY\_TO\_BOOT** event group ~~when~~ and before the Boot Manager is about to load and execute a boot option. The event group presents the last chance to survey device or system configuration prior to passing control to a boot option.