



Flicker Free Boot

Seamless boot for UEFI systems

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Topics

- What / why?
- Pre-kernel: Shim, GRUB
- Kernel: EFIFB + FBCON
- Kernel: i915
- Userspace: plymouth
- Userspace: framebuffer handover

Flicker Free
Boot?

Flicker Free Boot?

- The purpose is to boot to the desktop without the display ever losing signal and without any jarring graphical transitions
- Technical users often don't care what the boot looks like
- For regular users and OEMs however, having a smooth, professionally looking, boot is quite important
- <https://fedorapeople.org/~jwrdegoede/flickerfree-videos/>

Shim and GRUB

Shim and GRUB

- Shim and GRUB used to make an UEFI call to put the display in text mode even if they did not output any text at all
- Both have been patched to defer this UEFI call to the first time they have actual text to output
- The shim changes are upstream
- The GRUB changes are not upstream as upstream refuses to accept patches for a compile time option to make grub not print a version header

Kernel: EFIFB and FBCON

EFIFB and FBCON

- The UEFI FB code does not touch the FB, but the text-console on FB code, FBCON, takes over the FB right away, replacing its content with black
- FBCON has been patched to defer taking over to the first time there is actual text to output
- EFIFB has been patched to display or restore the firmware bootsplash image (ACPI BGRT) in case the firmware does not show this itself
- All patches for this are upstream

Disable? Use: fbcon=nodefer video=efib:nobgrt

Kernel: i915

i915 fastboot support

- The Intel GPU display driver will read back the hardware state when initializing
- This allows skipping a full modeset when asked to set a mode matching the current mode
- This (fastboot) is disabled by default because of some issues on mostly older hardware
- Working together with i915 upstream all known issues have been fixed now
- Enabled on Skylake+ in Fedora Rawhide, upstream 5.1 kernel release

Userspace: plymouth

Plymouth

- Until recently plymouth relied on FBCON to pick a mode and crtc for outputs not setup by UEFI
- Since we now defer FBCON taking over the FB, plymouth has been patched to do this itself
- Plymouth now also supports hotplugging monitors after plymouth starts
- Support has been added to plymouth to read the firmware boot splash (BGRT) and use it as a background, drawing on top of the splash
- All patches for this are upstream

Userspace framebuffer handover

FB handover (1)

- i915 will fallback to scanning out the firmware splash FB if the FB-owner exits, to avoid this:
 - Plymouth stops, drops drm-master, does not exit
 - GDM sets up its own FB, tells i915 to scan that out
 - GDM tells plymouth its ok to exit
 - GDM drops drm-master, starts user-session
 - GDM sleeps 10 seconds after this, then exits

FB handover (2)

- Proposal: Add a new IOCTL to tell a KMS driver to keep the current FB around until a new one is installed (Patch from Rob Clark in the archives)
- Problem: user-session mutter and Xorg FB contents could be privacy sensitive
- For mutter on Wayland we can make it close all windows and then redraw before the IOCTL
- For Xorg I don't see a solution, so a flicker-free user-session exit will only work on Wayland

Ideas? Suggestions? Questions?



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Git repositories:

<https://github.com/jwrdegoede/>