GrubEFIReinstall

Starting with Windows 8 most Desktop PC have EFI as firmware instead of the legacy BIOS. If your EFI based PC is not booting Debian, here are some ways to reinstall grub-efi, the bootloader used by Debian on these PCs.

To reinstall grub, you need either a live CD/USB to access your current system, or you can use the rEFInd boot manager on a live CD/USB to boot your current system.

Using A Live CD/USB To Fix Your Current System

(The following procedure is described in greater detail here.)

1. Boot (using UEFI) into a live system, such as a DebianLive CD/USB or the Debian installer in rescue mode. You can verify that the system has booted using UEFI by checking for the existence of the directory `/sys/firmware/efi` or by running `efibootmgr`.
2. If the directory /sys/firmware/efi/efivars is empty, you need to boot the rescue system including the kernel option "efi=runtime" and mount the EFI variables before proceeding:

   ```
   # mount -t efivarfs none /sys/firmware/efi/efivars
   ```

3. Mount the broken system somewhere into the running filesystem. The exact details of how to do this depend on the particulars of your installation.
   For example, for a system with an EFI partition on `/dev/sdb1`, an unencrypted `/boot` partition on `/dev/sdb2`, and an unencrypted `/` partition on `/dev/sdb3`, do:

   ```
   # mount /dev/sdb3 /mnt
   # mount /dev/sdb2 /mnt/boot
   # mount /dev/sdb1 /mnt/boot/efi
   ```

   Another example - for a system with an EFI partition on `/dev/sdb1` and `/` partition on `/dev/sdb2`, do:

   ```
   # mount /dev/sdb2 /mnt/
   # mount /dev/sdb1 /mnt/boot/efi
   ```

In case of a LUKS-encrypted `/` partition, please follow this guide: [GrubEFIReinstallOnLUKS](#).

4. Bind mount various virtual filesystems:

```
# for i in /dev /dev/pts /proc /sys /sys/firmware/efi/efivars /run; do mount -B $i /mnt/$i;
```

The mount executable supplied with busybox does not support the -B option, use "mount -o bind" in this case.

5. Chroot into the broken system:

```
# chroot /mnt
```

6. Reinstall GRUB to the appropriate disk (without partition number):

```
# grub-install /dev/sdb
```

7. Generate the GRUB configuration file:

```
# update-grub
```

8. Exit the `chroot` environment (<CTRL>-D).
9. If everything worked, reboot.

Using the rEFInd rescue media

At the author's web page, http://www.rodsbooks.com/refind/getting.html, you will find updated direct links to all sorts of packaging. To boot from a rescue media, select either the CD ISO image or the image for USB sticks. Most firmware offers the choice nowadays.
`If choosing the latter, make sure to follow the instructions in the README.` It is recommended to read the author's web pages to get a better understanding of what you are doing.

Boot your computer with the Refind media

rEFInd will parse your hard drive for installed kernels, and provide you a graphic menu to boot them. Choose your Linux Kernel and boot it.

Reinstalling grub-efi on your hard drive

Check that the computer booted in computer in EFI mode:

```
[ -d /sys/firmware/efi ] && echo "EFI boot on HDD" || echo "Legacy boot on HDD"
should return "EFI boot on HDD".
```

After starting a root shell (if you boot from a live media, you should start a chroot shell instead, as explained [here](#)) check that your EFI system partition (most probably /dev/sdb1) is mounted on /boot/efi. If the /boot/efi directory does not exist, you will need to create it.

```
mount /dev/sdb1 /boot/efi
```

Reinstall the grub-efi package

```
apt-get install --reinstall grub-efi
```

Put the Debian bootloader in /boot/efi and create an appropriate entry in the computer NVRAM

```
grub-install
```

Re create a grub config file based on your disk partitioning schema

```
update-grub
```

You should check afterwards that:

Check 1. the bootloader is existing in /boot/efi/EFI/debian/grubx64.efi

```
file /boot/efi/EFI/debian/grubx64.efi

/boot/efi/EFI/debian/grubx64.efi: PE32+ executable (EFI application) x86-64 (stripped to externa
```

Check 2. the NVRAM entry was properly created.

```
efibootmgr --verbose | grep debian
```

You can now reboot, and Grub should greet you.

Troubleshooting

If after this steps you're not booting, the EFI of your PC might have some bugs.

Problem1: Weak EFI implementation only recognizes the fallback bootloader

The UEFI firmware refuses to boot the debian/grubx64.efi bootloader, and so we have to hijack the UEFI fallback boot loader. See http://mjg59.livejournal.com/138188.html for details.

Using Debian installer in rescue mode, /dev/sdb1 being the FAT32 ESP partition, /dev/sdb2 the root partition

```
mkdir /target
mount /dev/sdb2 /target
mount /dev/sdb1 /target/boot/efi
for i in /sys /proc /dev; do mount --bind $i /target$i; done
chroot /target
```

```
cd /boot/efi/EFI
mkdir boot
cp debian/grubx64.efi boot/bootx64.efi
exit
for i in /sys /proc /dev; do umount /target$i; done
umount /target/boot/efi
umount /target
```

Once booted into your normal Debian, tell grub to ensure the fallback boot loader up to date. To do that, run the following:

```
echo "grub-efi-amd64 grub2/force_efi_extra_removable boolean true" | sudo debconf-set-selection
```

Note: The above command will permanently hijack the fallback bootloader, which might be undesirable in dual-boot setups.

Problem2: EFI boot entries disappear after reboot

The UEFI firmware did not create a proper boot entry in NVRAM. This has been seen in a Lenovo Thinkcenter M92Z. The symptom for this will be a missing HD path after the Debian entry in the `efibootmgr --verbose` output.

```
BootCurrent: 0024
Timeout: 0 seconds
```

```
BootOrder: 0024,0022,0023,0016,0000,0001
Boot0000* debian          Vendor(99e275e7-75a0-4b37-a2e6-c5385e6c00cb,)
Boot0016* Generic Usb Device    Vendor(99e275e7-75a0-4b37-a2e6-c5385e6c00cb,)
Boot0022* UEFI: IPv4 Intel(R) 82579LM Gigabit Network Connection      ACPI(a0341d0,0)PCI(19,0)
Boot0023* UEFI: IPv6 Intel(R) 82579LM Gigabit Network Connection      ACPI(a0341d0,0)PCI(19,0)
Boot0024* UEFI: Generic Flash Disk 8.00 ACPI(a0341d0,0)PCI(1d,0)USB(1,0)USB(1,0)HD(1,800,2a5f,02
```

You can then try to install rEFInd as your bootloader in the hard drive, following the steps at this gist: https://gist.github.com/EmmanuelKasper/9590327.

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