batocera.linux architecture

Buildroot

batocera.linux is based on buildroot. You can see buildroot as a Linux distribution while it maintains base packages. However, it's a tool to build root file systems (like a firmware). batocera.linux mainly includes extra packages not available on buildroot (emulators) and configuration.

More information about buildroot can be found here : https://buildroot.org

System mount points / firmware / overlays

Technically, batocera.linux has 2 partitions. 1 for the system, 1 for the user data. The partition named BATOCERA visible on any computer under Windows, MacOS or Linux is the system data.

It contains mainly 3 files :

- `linux`, the technical system (about 10 MB)
- `batocera`, the software system containing all the programs (about 1.1GB compressed)
- `initrd.gz` or `uInitrd`, the loader (about 600 kB)

Upgrading the system means mainly that these 3 files are getting upgraded. There are some other files depending on the architecture.

The file `batocera` can be seen like a firmware, you cannot modify it. However the architecture is a bit more complex and allows you to modify the firmware without recompiling everything : batocera.linux supports and uses by default **overlayfs**. The real system is the firmware (the file `batocera`) + a filesystem in memory initialized with the file overlay if it exists. The overlay is an in-memory filesystem and not directly the overlay file because under linux, you cannot properly unmount the root filesystem, mainly when it's a complex root from several filesystems.

As a general rule, the file `overlay` doesn't exist, unless it's created by the script `batocera-save-overlay` if a user or developer customizes the system.

```
+--------------------------------+
| TMPFS, writable                | --> must be saved explicitly on
/boot/overlay
+--------------------------------+
| firmware (squashfs), read only |
+--------------------------------+
```

More details on overlayfs can be found here :
http://embedded-computing.com/guest-blogs/understand-what-an-overlayfs-is-and-how-it-works

Sdcard / EMMC / Usb key / Hard drive

When you create the card to run batocera.linux, the card is more complex than a basic card, and it's

dependent on the architecture. It's why you need a special tool to burn it.

- BEFORE BOOT : these are technical files to be able to access the BOOT partition and run the Linux kernel.
- BOOT : this partition is visible on Windows. This is where the batocera.linux system is.
- FREE : this free space is filled with a SHARE partition on the first boot to save all the user data (ROMs and ancillary files like screenshots, video snaps and so on).
- SHARE : this partition replaces FREE at the first boot. It is partitioned as EXT4.

RPI SD CARD

```
      1                   1263
+-----+-------------------+--------+--------------+
| MBR |                    |  BOOT  |     FREE     |
+-----+-------------------+--------+--------------+
     512                 631K
```

X86/X86_64 USB KEY / HARD DRIVE

```
      1                   1263
+-----+-------------------+--------+--------------+
| MBR | GRUB               |  BOOT  |     FREE     |
+-----+-------------------+--------+--------------+
     512                 631K
```

XU4 SD/EMMC CARD

```
      1      31      63          719     1231    1263
+-----+-------+-------+-----------+--------+-------+----------+-------------
-+
| MBR |  bl1  |  bl2  |   uboot   |  tzsw  |       |   BOOT   |     FREE
|
+-----+-------+-------+-----------+--------+-------+----------+-------------
-+
     512     15K     31K         359K     615K    631K       1.2G
```

C2 SD CARD

```
      1       97         1281
+-----+-------+-----------+--------+--------------+
| MBR |  bl1  |   uboot   |  BOOT  |     FREE     |
+-----+-------+-----------+--------+--------------+
     512     48K         640K
```