

A Brief Tour of the Raspbian Boot Process

The Raspbian system is in two partitions, a 64 MB “boot” partition containing 21 MB of files needed for booting up the system and a much larger “root” partition that is expanded to fill the remainder of the SD memory card.

Doing `df -T` shows

Filesystem	Type	1K-blocks	Used	Available	Use%	Mounted on
/dev/root	ext4	30552892	11742724	17514500	41%	/
devtmpfs	devtmpfs	437060	0	437060	0%	/dev
tmpfs	tmpfs	441392	0	441392	0%	/dev/shm
tmpfs	tmpfs	441392	6080	435312	2%	/run
tmpfs	tmpfs	5120	4	5116	1%	/run/lock
tmpfs	tmpfs	441392	0	441392	0%	/sys/fs/cgroup
/dev/mmcblk0p1	vfat	64456	20984	43472	33%	/boot
tmpfs	tmpfs	88280	0	88280	0%	/run/user/1000

where these two partitions are shown in bold face.

There are two processors in the Raspberry Pi 3, a VideoCore IV graphics processor (GPU) and a quad-core ARM Cortex A53 central processing unit (CPU). The GPU starts the boot by loading the Linux kernel into memory starting it. The messages below from `/var/log/syslog` that say `kernel:` are then printed as the various parts of the kernel activate.

The kernel source code is 1.4 GB in size, and when compiled, produces one large 4 MB file of essential object code, 13 MB of other boot-related code, and 51 MB of module files which are available as needed. The main kernel file is `/boot/kernel7.img` and the modules are in files under `/lib/modules/4.4.13-v7+/kernel/`, each ending in the file extension `.ko`. The choice of modules and whether they are built into the kernel is controlled by a config file which appears as `/proc/config.gz` when you do `sudo modprobe configs`. You can study it by doing `vi /proc/config.gz` and see thousands of choices, each as “y”, “m”, or “not set” for “yes”, “module” or “not included”. There are also entries that specify desired values for kernel variables. After this file is edited to select the desired kernel configuration, the kernel is compiled to produce the necessary boot files and desired module files.

Many other supporting program and data files are placed in the root partition. After the kernel code is initialized, code from some of those files is run to make the system fully operational. Much of that work is coordinated by a program called `systemd` which efficiently executes those programs. `Systemd` has a default target such as “graphical system” or “multi-user system”, and prepares the system for that target condition.

Since there is no battery-powered real-time clock, the system fakes a clock and synchronizes it later to the time available from a network connection. Upon system shutdown, that time is saved to be used at the next boot until it can again be synchronized.

First messages from the kernel

```
03:16:47 kernel: [ 0.000000] Booting Linux on physical CPU 0x0
03:16:47 kernel: [ 0.000000] Initializing cgroup subsys cpuset
03:16:47 kernel: [ 0.000000] Initializing cgroup subsys cpu
03:16:47 kernel: [ 0.000000] Initializing cgroup subsys cpuacct
```

SMP = Symmetric Multi-Processor

```
03:16:47 kernel: [ 0.000000] Linux version 4.4.13-v7+ (dc4@dc4-XPS13-9333) (gcc version 4.9.3 (crosstool-NG crosstool-ng-1.22.0-88-g8460611) ) #894 SMP Mon Jun 13 13:13:27 BST 2016
```

```
03:16:47 kernel: [ 0.000000] CPU: ARMv7 Processor [410fd034] revision 4 (ARMv7), cr=10c5383d
```

PIPT = Physically indexed, physically tagged, VIPT = Virtually indexed, physically tagged

See https://en.wikipedia.org/wiki/CPU_cache

```
03:16:47 kernel: [ 0.000000] CPU: PIPT / VIPT nonaliasing data cache, VIPT aliasing instruction cache
```

```
03:16:47 kernel: [ 0.000000] Machine model: Raspberry Pi 3 Model B Rev 1.2
```

cma = Continuous Memory Allocator

```
03:16:47 kernel: [ 0.000000] cma: Reserved 8 MiB at 0x36800000
03:16:47 kernel: [ 0.000000] Memory policy: Data cache writealloc
03:16:47 kernel: [ 0.000000] On node 0 totalpages: 225280
03:16:47 kernel: [ 0.000000] free_area_init_node: node 0, pgdat 808c0e00, node_mem_map b6036000
03:16:47 kernel: [ 0.000000] Normal zone: 1980 pages used for memmap
03:16:47 kernel: [ 0.000000] Normal zone: 0 pages reserved
03:16:47 kernel: [ 0.000000] Normal zone: 225280 pages, LIFO batch:31
```

```

03:16:47 kernel: [ 0.000000] [bcm2709_smp_init_cpus] enter (9520->f3003010)
03:16:47 kernel: [ 0.000000] [bcm2709_smp_init_cpus] ncores=4
03:16:47 kernel: [ 0.000000] PERCPU: Embedded 13 pages/cpu @b5ff2000 s22592 r8192 d22464 u53248
03:16:47 kernel: [ 0.000000] pcpu-alloc: s22592 r8192 d22464 u53248 alloc=13*4096
03:16:47 kernel: [ 0.000000] pcpu-alloc: [0] 0 [0] 1 [0] 2 [0] 3
03:16:47 kernel: [ 0.000000] Built 1 zonelists in Zone order, mobility grouping on. Total pages: 223300

03:16:47 kernel: [ 0.000000] Kernel command line: 8250.nr_uarts=0 dma.dmachans=0x7f35 bcm2708_fb.fbwidth=1824
bcm2708_fb.fbheight=984 bcm2709.boardrev=0xa22082 bcm2709.serial=0xb9ecdf66 smsc95xx.macaddr=B8:27:EB:EC:DF:E6
bcm2708_fb.fbswap=1 bcm2709.uart_clock=48000000 vc_mem.mem_base=0x3dc00000 vc_mem.mem_size=0x3f000000 dwc_otg.lpm_enable=0
console=ttyS0,115200 console=tty1 root=/dev/mmblk0p2 rootfstype=ext4 elevator=deadline fsck.repair=yes rootwait
usbhid.mousepoll=0

03:16:47 kernel: [ 0.000000] PID hash table entries: 4096 (order: 2, 16384 bytes)
03:16:47 kernel: [ 0.000000] Dentry cache hash table entries: 131072 (order: 7, 524288 bytes)
03:16:47 kernel: [ 0.000000] Inode-cache hash table entries: 65536 (order: 6, 262144 bytes)

03:16:47 kernel: [ 0.000000] Memory: 874120K/901120K available (6344K kernel code, 432K rwdata, 1712K rodata, 476K init,
764K bss, 18808K reserved, 8192K cma-reserved)
03:16:47 kernel: [ 0.000000] Virtual kernel memory layout:
03:16:47 kernel: [ 0.000000] vector : 0xffff0000 - 0xffff1000 ( 4 kB)
03:16:47 kernel: [ 0.000000] fixmap : 0xffc00000 - 0xffff0000 (3072 kB)
03:16:47 kernel: [ 0.000000] vmalloc : 0xb7800000 - 0xff800000 (1152 MB)
03:16:47 kernel: [ 0.000000] lowmem : 0x80000000 - 0xb7000000 ( 880 MB)
03:16:47 kernel: [ 0.000000] modules : 0x7f000000 - 0x80000000 ( 16 MB)
03:16:47 kernel: [ 0.000000] .text : 0x80008000 - 0x807e6470 (8058 kB)
03:16:47 kernel: [ 0.000000] .init : 0x807e7000 - 0x8085e000 ( 476 kB)
03:16:47 kernel: [ 0.000000] .data : 0x8085e000 - 0x808ca108 ( 433 kB)
03:16:47 kernel: [ 0.000000] .bss : 0x808cd000 - 0x8098c1ac ( 765 kB)
03:16:47 kernel: [ 0.000000] SLUB: Hwalign=64, Order=0-3, MinObjects=0, CPUs=4, Nodes=1
03:16:47 kernel: [ 0.000000] Hierarchical RCU implementation.
03:16:47 kernel: [ 0.000000] Build-time adjustment of leaf fanout to 32.
03:16:47 kernel: [ 0.000000] NR_IRQS:16 nr_irqs:16 16
03:16:47 kernel: [ 0.000000] Architected cp15 timer(s) running at 19.20MHz (phys).
03:16:47 kernel: [ 0.000000] clocksource: arch_sys_counter: mask: 0xffffffffffffff max_cycles: 0x46d987e47, max_idle_ns:
440795202767 ns
03:16:47 kernel: [ 0.000007] sched_clock: 56 bits at 19MHz, resolution 52ns, wraps every 4398046511078ns
03:16:47 kernel: [ 0.000024] Switching to timer-based delay loop, resolution 52ns

03:16:47 kernel: [ 0.000283] Console: colour dummy device 80x30
03:16:47 kernel: [ 0.001337] console [tty1] enabled

03:16:47 kernel: [ 0.001381] Calibrating delay loop (skipped), value calculated using timer frequency.. 38.40 BogoMIPS
(lpj=192000)
03:16:47 kernel: [ 0.001450] pid_max: default: 32768 minimum: 301
03:16:47 kernel: [ 0.001789] Mount-cache hash table entries: 2048 (order: 1, 8192 bytes)
03:16:47 kernel: [ 0.001831] Mountpoint-cache hash table entries: 2048 (order: 1, 8192 bytes)
03:16:47 kernel: [ 0.002789] Disabling cpuset control group subsystem
03:16:47 kernel: [ 0.002848] Initializing cgroup subsys io
03:16:47 kernel: [ 0.002899] Initializing cgroup subsys memory
03:16:47 kernel: [ 0.002959] Initializing cgroup subsys devices
03:16:47 kernel: [ 0.003002] Initializing cgroup subsys freezer
03:16:47 kernel: [ 0.003045] Initializing cgroup subsys net_cls
03:16:47 kernel: [ 0.003116] CPU: Testing write buffer coherency: ok
03:16:47 kernel: [ 0.003203] ftrace: allocating 21209 entries in 63 pages
03:16:47 kernel: [ 0.053615] CPU0: update cpu_capacity 1024
03:16:47 kernel: [ 0.053680] CPU0: thread -1, cpu 0, socket 0, mpidr 80000000
03:16:47 kernel: [ 0.053714] [bcm2709_smp_prepare_cpus] enter
03:16:47 kernel: [ 0.053867] Setting up static identity map for 0x8240 - 0x8274
03:16:47 kernel: [ 0.055525] [bcm2709_boot_secondary] cpu:1 started (0) 17
03:16:47 kernel: [ 0.055855] [bcm2709_secondary_init] enter cpu:1
03:16:47 kernel: [ 0.055897] CPU1: update cpu_capacity 1024
03:16:47 kernel: [ 0.055903] CPU1: thread -1, cpu 1, socket 0, mpidr 80000001
03:16:47 kernel: [ 0.056276] [bcm2709_boot_secondary] cpu:2 started (0) 17
03:16:47 kernel: [ 0.056539] [bcm2709_secondary_init] enter cpu:2
03:16:47 kernel: [ 0.056560] CPU2: update cpu_capacity 1024
03:16:47 kernel: [ 0.056566] CPU2: thread -1, cpu 2, socket 0, mpidr 80000002
03:16:47 kernel: [ 0.056925] [bcm2709_boot_secondary] cpu:3 started (0) 16
03:16:47 kernel: [ 0.057107] [bcm2709_secondary_init] enter cpu:3
03:16:47 kernel: [ 0.057127] CPU3: update cpu_capacity 1024
03:16:47 kernel: [ 0.057133] CPU3: thread -1, cpu 3, socket 0, mpidr 80000003
03:16:47 kernel: [ 0.057194] Brought up 4 CPUs
03:16:47 kernel: [ 0.057292] SMP: Total of 4 processors activated (153.60 BogoMIPS).
03:16:47 kernel: [ 0.057321] CPU: All CPU(s) started in HYP mode.
03:16:47 kernel: [ 0.057347] CPU: Virtualization extensions available.

03:16:47 kernel: [ 0.057980] devtmpfs: initialized

VFP = Vector Floating Point ARM architecture extension
03:16:47 kernel: [ 0.068174] VFP support v0.3: implementor 41 architecture 3 part 40 variant 3 rev 4

03:16:47 kernel: [ 0.068532] clocksource: jiffies: mask: 0xffffffff max_cycles: 0xffffffff, max_idle_ns: 19112604462750000
ns

pinctrl = control of processor io pin usage (multiplexing, naming, ...)
03:16:47 kernel: [ 0.069272] pinctrl core: initialized pinctrl subsystem

```

```

protocol family 16 = Netlink (AF_NETLINK)
03:16:47 kernel: [ 0.069828] NET: Registered protocol family 16

DMA = Direct Memory Addressing
03:16:47 kernel: [ 0.075049] DMA: preallocated 4096 KiB pool for atomic coherent allocations
03:16:47 kernel: [ 0.081954] hw-breakpoint: found 5 (+1 reserved) breakpoint and 4 watchpoint registers.
03:16:47 kernel: [ 0.082003] hw-breakpoint: maximum watchpoint size is 8 bytes.

UART = Universal Asynchronous Receiver Transmitter (A serial communication protocol)
03:16:47 kernel: [ 0.082183] Serial: AMBA PL011 UART driver
03:16:47 kernel: [ 0.082341] uart-pl011 3f201000.uart: could not find pctldev for node /soc/gpio@7e200000/uart0_pins,
deferring probe

Video processor (bcm2835) initialization
03:16:47 kernel: [ 0.082546] bcm2835-mbox 3f00b880.mailbox: mailbox enabled
03:16:47 kernel: [ 0.145761] bcm2835-dma 3f007000.dma: DMA legacy API manager at f3007000, dmachans=0x1

SCSI = Small Computer System Interface (a protocol for disk access)
03:16:47 kernel: [ 0.146360] SCSI subsystem initialized

USB = Universal Serial Bus
03:16:47 kernel: [ 0.146557] usbcore: registered new interface driver usbfs
03:16:47 kernel: [ 0.146667] usbcore: registered new interface driver hub
03:16:47 kernel: [ 0.146786] usbcore: registered new device driver usb

03:16:47 kernel: [ 0.153170] raspberrypi-firmware soc:firmware: Attached to firmware from 2016-06-20 18:18

03:16:47 kernel: [ 0.180432] clocksource: Switched to clocksource arch_sys_counter

03:16:47 kernel: [ 0.225129] FS-Cache: Loaded
03:16:47 kernel: [ 0.225421] CacheFiles: Loaded

protocol family 2 = Internet Protocol version 4 (AF_INET)
03:16:47 kernel: [ 0.237731] NET: Registered protocol family 2
03:16:47 kernel: [ 0.238602] TCP established hash table entries: 8192 (order: 3, 32768 bytes)
03:16:47 kernel: [ 0.238740] TCP bind hash table entries: 8192 (order: 4, 65536 bytes)
03:16:47 kernel: [ 0.238950] TCP: Hash tables configured (established 8192 bind 8192)
03:16:47 kernel: [ 0.239065] UDP hash table entries: 512 (order: 2, 16384 bytes)
03:16:47 kernel: [ 0.239133] UDP-Lite hash table entries: 512 (order: 2, 16384 bytes)

protocol family 1 = Unix Domain Sockets (AF_UNIX)
03:16:47 kernel: [ 0.239385] NET: Registered protocol family 1

RPC = Remote Procedure Call
03:16:47 kernel: [ 0.239720] RPC: Registered named UNIX socket transport module.
03:16:47 kernel: [ 0.239753] RPC: Registered udp transport module.
03:16:47 kernel: [ 0.239780] RPC: Registered tcp transport module.
03:16:47 kernel: [ 0.239808] RPC: Registered tcp NFSv4.1 backchannel transport module.

03:16:47 kernel: [ 0.240939] hw perfevents: enabled with armv7_cortex_a7 PMU driver, 7 counters available
03:16:47 kernel: [ 0.242273] futex hash table entries: 1024 (order: 4, 65536 bytes)

VFS = Virtual File System
03:16:47 kernel: [ 0.255582] VFS: Disk quotas dquot_6.6.0
03:16:47 kernel: [ 0.255915] VFS: Dquot-cache hash table entries: 1024 (order 0, 4096 bytes)

03:16:47 kernel: [ 0.258216] FS-Cache: Netfs 'nfs' registered for caching

NFS = Network File System (Mounting directories from other systems)
03:16:47 kernel: [ 0.259131] NFS: Registering the id_resolver key type
03:16:47 kernel: [ 0.259199] Key type id_resolver registered
03:16:47 kernel: [ 0.259227] Key type id_legacy registered

03:16:47 kernel: [ 0.261572] Block layer SCSI generic (bsg) driver version 0.4 loaded (major 252)

03:16:47 kernel: [ 0.261741] io scheduler noop registered
03:16:47 kernel: [ 0.261781] io scheduler deadline registered (default)
03:16:47 kernel: [ 0.261855] io scheduler cfq registered

03:16:47 kernel: [ 0.264392] BCM2708FB: allocated DMA memory f6c00000
03:16:47 kernel: [ 0.264438] BCM2708FB: allocated DMA channel 0 @ f3007000

03:16:47 kernel: [ 0.290973] Console: switching to colour frame buffer device 228x61

More video core initialization
03:16:47 kernel: [ 1.216233] bcm2835-rng 3f104000.rng: hwrng registered
03:16:47 kernel: [ 1.216479] vc-cma: Videocore CMA driver
03:16:47 kernel: [ 1.216555] vc-cma: vc_cma_base = 0x00000000
03:16:47 kernel: [ 1.216637] vc-cma: vc_cma_size = 0x00000000 (0 MiB)
03:16:47 kernel: [ 1.216728] vc-cma: vc_cma_initial = 0x00000000 (0 MiB)
03:16:47 kernel: [ 1.217039] vc-mem: phys_addr:0x00000000 mem_base=0x3dc00000 mem_size:0x3f000000(1008 MiB)

brd has to do with ram disk
03:16:47 kernel: [ 1.231988] brd: module loaded

```

loop allows contents of suitable files to be treated as entire filesystems

03:16:47 kernel: [1.240749] loop: module loaded

vchiq = Video Core Hi-Q (DivX HiQ video playback using Broadcom VideoCore processor)

03:16:47 kernel: [1.241762] vchiq: vchiq_init_state: slot_zero = 0xb6c80000, is_master = 0

iSCSI = Internet Small Computer System Interface (allows SCSI protocols to be used over Internet protocol)

03:16:47 kernel: [1.243351] Loading iSCSI transport class v2.0-870.

03:16:47 kernel: [1.244072] usbcore: registered new interface driver smsc95xx

dwc_otg = DesignWare Company On-the-Go On-the-Go is a supplement for embedded systems to the USB 2.0 and 3.0 USB standards

03:16:47 kernel: [1.244210] dwc_otg: version 3.00a 10-AUG-2012 (platform bus)

03:16:47 kernel: [1.444571] Core Release: 2.80a

03:16:47 kernel: [1.444642] Setting default values for core params

03:16:47 kernel: [1.444751] Finished setting default values for core params

03:16:47 kernel: [1.645201] Using Buffer DMA mode

03:16:47 kernel: [1.645267] Periodic Transfer Interrupt Enhancement - disabled

03:16:47 kernel: [1.645364] Multiprocessor Interrupt Enhancement - disabled

03:16:47 kernel: [1.645457] OTG VER PARAM: 0, OTG VER FLAG: 0

03:16:47 kernel: [1.645539] Dedicated Tx FIFOs mode

03:16:47 kernel: [1.645880] WARN::dwc_otg_hcd_init:1047: FIQ DMA bounce buffers: virt = 0xb6c14000 dma = 0xf6c14000 len=9024

03:16:47 kernel: [1.646053] FIQ FSM acceleration enabled for :

03:16:47 kernel: [1.646053] Non-periodic Split Transactions

03:16:47 kernel: [1.646053] Periodic Split Transactions

03:16:47 kernel: [1.646053] High-Speed Isochronous Endpoints

03:16:47 kernel: [1.646053] Interrupt/Control Split Transaction hack enabled

03:16:47 kernel: [1.650388] dwc_otg: Microframe scheduler enabled

03:16:47 kernel: [1.650460] WARN::hcd_init_fiq:413: FIQ on core 1 at 0x80446a60

03:16:47 kernel: [1.654595] WARN::hcd_init_fiq:414: FIQ ASM at 0x80446dd0 length 36

03:16:47 kernel: [1.658718] WARN::hcd_init_fiq:439: MPHI regs_base at 0xb82fe000

03:16:47 kernel: [1.662851] dwc_otg 3f980000.usb: DWC OTG Controller

03:16:47 kernel: [1.666947] dwc_otg 3f980000.usb: new USB bus registered, assigned bus number 1

03:16:47 kernel: [1.671075] dwc_otg 3f980000.usb: irq 62, io mem 0x00000000

03:16:47 kernel: [1.675171] Init: Port Power? op_state=1

03:16:47 kernel: [1.679191] Init: Power Port (0)

03:16:47 kernel: [1.683376] usb usb1: New USB device found, idVendor=1d6b, idProduct=0002

03:16:47 kernel: [1.687439] usb usb1: New USB device strings: Mfr=3, Product=2, SerialNumber=1

03:16:47 kernel: [1.691529] usb usb1: Product: DWC OTG Controller

03:16:47 kernel: [1.695628] usb usb1: Manufacturer: Linux 4.4.13-v7+ dwc_otg_hcd

03:16:47 kernel: [1.699751] usb usb1: SerialNumber: 3f980000.usb

03:16:47 kernel: [1.704649] hub 1-0:1.0: USB hub found

03:16:47 kernel: [1.708706] hub 1-0:1.0: 1 port detected

03:16:47 kernel: [1.713270] dwc_otg: FIQ enabled

03:16:47 kernel: [1.713279] dwc_otg: NAK holdoff enabled

03:16:47 kernel: [1.713287] dwc_otg: FIQ split-transaction FSM enabled

03:16:47 kernel: [1.713325] Module dwc_common_port init

03:16:47 kernel: [1.713594] usbcore: registered new interface driver usb-storage

03:16:47 kernel: [1.717857] mousedev: PS/2 mouse device common for all mice

03:16:47 kernel: [1.722585] bcm2835-cpufreq: min=600000 max=1200000

03:16:47 kernel: [1.726820] sdhci: Secure Digital Host Controller Interface driver

03:16:47 kernel: [1.730819] sdhci: Copyright(c) Pierre Ossman

03:16:47 kernel: [1.735102] sdhost: log_buf @ b6c13000 (f6c13000)

03:16:47 kernel: [1.810559] mmc0: sdhost-bcm2835 loaded - DMA enabled (>1)

03:16:47 kernel: [1.816802] mmc-bcm2835 3f300000.mmc: mmc_debug:0 mmc_debug2:0

03:16:47 kernel: [1.820779] mmc-bcm2835 3f300000.mmc: DMA channel allocated

03:16:47 kernel: [1.870548] sdhci-pltfm: SDHCI platform and OF driver helper

03:16:47 kernel: [1.874916] ledtrig-cpu: registered to indicate activity on CPUs

03:16:47 kernel: [1.879020] hidraw: raw HID events driver (C) Jiri Kosina

03:16:47 kernel: [1.883204] usbcore: registered new interface driver usbhid

03:16:47 kernel: [1.887226] usbhid: USB HID core driver

XFRM (a NETLINK interface to manage the IPsec security association and security policy databases)

03:16:47 kernel: [1.891758] Initializing XFRM netlink socket

protocol family 17 = Packet Family (AF_PACKET)

03:16:47 kernel: [1.895744] NET: Registered protocol family 17

03:16:47 kernel: [1.899824] Key type dns_resolver registered

03:16:47 kernel: [1.904340] Registering SWP/SWPB emulation handler

03:16:47 kernel: [1.909137] registered taskstats version 1

03:16:47 kernel: [1.910346] mmc0: host does not support reading read-only switch, assuming write-enable

03:16:47 kernel: [1.913379] mmc0: new high speed SDHC card at address aaaa

03:16:47 kernel: [1.913963] mmcblk0: mmc0:aaaa SE32G 29.7 GiB

03:16:47 kernel: [1.918076] mmcblk0: p1 p2

03:16:47 kernel: [1.929441] Indeed it is in host mode hprt0 = 00021501

03:16:47 kernel: [1.934988] mmc1: queuing unknown CIS tuple 0x80 (2 bytes)

More video core stuff

```
03:16:47 kernel: [ 1.940682] vc-sm: Videocore shared memory driver
03:16:47 kernel: [ 1.944675] [vc_sm_connected_init]: start
03:16:47 kernel: [ 1.953224] [vc_sm_connected_init]: end - returning 0
```

mmc = multi-media card (The standard used for SD card storage)

```
03:16:47 kernel: [ 1.948734] mmc1: queuing unknown CIS tuple 0x80 (3 bytes)
03:16:47 kernel: [ 1.958188] mmc1: queuing unknown CIS tuple 0x80 (3 bytes)
03:16:47 kernel: [ 1.958651] 3f201000.uart: ttyAMA0 at MMIO 0x3f201000 (irq = 87, base_baud = 0) is a PL011 rev2
03:16:47 kernel: [ 1.962335] of_cfs_init
03:16:47 kernel: [ 1.962446] of_cfs_init: OK
03:16:47 kernel: [ 1.977161] mmc1: queuing unknown CIS tuple 0x80 (7 bytes)
```

Mounting main (root) filesystem, temporarily as read-only

```
03:16:47 kernel: [ 1.996645] EXT4-fs (mmcblk0p2): mounted filesystem with ordered data mode. Opts: (null)
03:16:47 kernel: [ 2.000791] VFS: Mounted root (ext4 filesystem) readonly on device 179:2.
03:16:47 kernel: [ 2.007169] devtmpfs: mounted
03:16:47 kernel: [ 2.011934] Freeing unused kernel memory: 476K (807e7000 - 8085e000)
03:16:47 kernel: [ 2.072630] mmc1: new high speed SDIO card at address 0001
```

```
03:16:47 kernel: [ 2.110483] usb 1-1: new high-speed USB device number 2 using dwc_otg
03:16:47 kernel: [ 2.114817] Indeed it is in host mode hprt0 = 00001101
```

Random number generator has acquired sufficient entropy to be usable

```
03:16:47 kernel: [ 2.245893] random: systemd urandom read with 32 bits of entropy available
```

USB/Ethernet Adapter found

```
03:16:47 kernel: [ 2.310802] usb 1-1: New USB device found, idVendor=0424, idProduct=9514
03:16:47 kernel: [ 2.315270] usb 1-1: New USB device strings: Mfr=0, Product=0, SerialNumber=0
03:16:47 kernel: [ 2.320506] hub 1-1:1.0: USB hub found
03:16:47 kernel: [ 2.325000] hub 1-1:1.0: 5 ports detected
```

protocol family 10 = Internet protocol version 6 (AF_INET6)

```
03:16:47 kernel: [ 2.381365] NET: Registered protocol family 10
03:16:47 kernel: [ 2.610497] usb 1-1.1: new high-speed USB device number 3 using dwc_otg
03:16:47 kernel: [ 2.710806] usb 1-1.1: New USB device found, idVendor=0424, idProduct=ec00
03:16:47 kernel: [ 2.715281] usb 1-1.1: New USB device strings: Mfr=0, Product=0, SerialNumber=0
03:16:47 kernel: [ 2.722650] smsc95xx v1.0.4
03:16:47 kernel: [ 2.784208] smsc95xx 1-1.1:1.0 eth0: register 'smc95xx' at usb-3f980000.usb-1.1, smc95xx USB 2.0
Ethernet, b8:27:eb:ec:df:e6
03:16:47 kernel: [ 3.199910] fuse init (API version 7.23)
03:16:47 kernel: [ 3.263649] i2c /dev entries driver
03:16:47 kernel: [ 3.300524] usb 1-1.4: new full-speed USB device number 4 using dwc_otg
```

USB Keyboard/Mouse Adapter found

```
03:16:47 kernel: [ 3.426221] usb 1-1.4: New USB device found, idVendor=062a, idProduct=4101
03:16:47 kernel: [ 3.430994] usb 1-1.4: New USB device strings: Mfr=1, Product=2, SerialNumber=0
03:16:47 kernel: [ 3.435662] usb 1-1.4: Product: 2.4G Keyboard Mouse
03:16:47 kernel: [ 3.440312] usb 1-1.4: Manufacturer: MOSART Semi.
03:16:47 kernel: [ 3.449958] input: MOSART Semi. 2.4G Keyboard Mouse as /devices/platform/soc/3f980000.usb/usb1/1-1/1-1.4/1-1.4:1.0/0003:062A:4101.0001/input/input0
03:16:47 kernel: [ 3.511326] hid-generic 0003:062A:4101.0001: input,hidraw0: USB HID v1.10 Keyboard [MOSART Semi. 2.4G Keyboard Mouse] on usb-3f980000.usb-1.4/input0
03:16:47 kernel: [ 3.523514] input: MOSART Semi. 2.4G Keyboard Mouse as /devices/platform/soc/3f980000.usb/usb1/1-1/1-1.4/1-1.4:1.1/0003:062A:4101.0002/input/input1
03:16:47 kernel: [ 3.581213] hid-generic 0003:062A:4101.0002: input,hiddev0,hidraw1: USB HID v1.10 Mouse [MOSART Semi. 2.4G Keyboard Mouse] on usb-3f980000.usb-1.4/input1

03:16:47 kernel: [ 4.191759] gpiomem-bcm2835 3f200000.gpiomem: Initialised: Registers at 0x3f200000
03:16:47 kernel: [ 4.234184] bcm2835-wdt 3f100000.watchdog: Broadcom BCM2835 watchdog timer
```

Main (root) filesystem remounted as read-write

```
03:16:47 kernel: [ 4.492335] EXT4-fs (mmcblk0p2): re-mounted. Opts: (null)
```

Built-in Wireless Device found

```
03:16:47 kernel: [ 4.513849] usbcore: registered new interface driver brcmfmac
03:16:47 kernel: [ 4.647905] brcmfmac: brcmf_c_preinit_dcmds: Firmware version = wl0: May 27 2016 00:13:38 version 7.45.41.26 (r640327) FWID 01-df77e4a7
03:16:47 kernel: [ 4.672302] brcmfmac: brcmf_cfg80211_reg_notifier: not a ISO3166 code
03:16:47 kernel: [ 4.818924] brcmfmac: brcmf_cfg80211_reg_notifier: not a ISO3166 code
03:16:47 kernel: [ 4.818960] cfg80211: World regulatory domain updated:
03:16:47 kernel: [ 4.818971] cfg80211: DFS Master region: unset
03:16:47 kernel: [ 4.818982] cfg80211: (start_freq - end_freq @ bandwidth), (max_antenna_gain, max_eirp), (dfs_cac_time)
03:16:47 kernel: [ 4.819006] cfg80211: (2402000 KHz - 2472000 KHz @ 40000 KHz), (N/A, 2000 mBm), (N/A)
03:16:47 kernel: [ 4.819032] cfg80211: (2457000 KHz - 2482000 KHz @ 40000 KHz), (N/A, 2000 mBm), (N/A)
03:16:47 kernel: [ 4.819046] cfg80211: (2474000 KHz - 2494000 KHz @ 20000 KHz), (N/A, 2000 mBm), (N/A)
03:16:47 kernel: [ 4.819060] cfg80211: (5170000 KHz - 5250000 KHz @ 80000 KHz, 160000 KHz AUTO), (N/A, 2000 mBm), (N/A)
03:16:47 kernel: [ 4.819074] cfg80211: (5250000 KHz - 5330000 KHz @ 80000 KHz, 160000 KHz AUTO), (N/A, 2000 mBm), (0 s)
03:16:47 kernel: [ 4.819086] cfg80211: (5490000 KHz - 5730000 KHz @ 160000 KHz), (N/A, 2000 mBm), (0 s)
03:16:47 kernel: [ 4.819099] cfg80211: (5735000 KHz - 5835000 KHz @ 80000 KHz), (N/A, 2000 mBm), (N/A)
03:16:47 kernel: [ 4.819112] cfg80211: (57240000 KHz - 63720000 KHz @ 2160000 KHz), (N/A, 0 mBm), (N/A)

03:16:47 kernel: [ 5.007884] random: nonblocking pool is initialized
```

iptables firewall initialization

```
03:16:47 kernel: [ 5.659699] ip_tables: (C) 2000-2006 Netfilter Core Team
```

```

03:16:47 kernel: [ 5.678900] nf_conntrack version 0.5.0 (13793 buckets, 55172 max)
03:16:47 kernel: [ 6.005173] brcmfmac: brcmf_add_if: ERROR: netdev:wlan0 already exists
03:16:47 kernel: [ 6.005200] brcmfmac: brcmf_add_if: ignore IF event
03:16:47 kernel: [ 6.010247] IPv6: ADDRCONF(NETDEV_UP): wlan0: link is not ready
03:16:47 kernel: [ 6.010276] brcmfmac: power management disabled

03:16:47 kernel: [ 6.357512] uart-pl011 3f201000.uart: no DMA platform data

Creating 100 MB of swap space in /var/swap
03:16:47 kernel: [ 6.701336] Adding 102396k swap on /var/swap. Priority:-1 extents:4 across:1658876k SSFS

03:16:47 kernel: [ 7.212192] smsc95xx 1-1.1:1.0 eth0: hardware isn't capable of remote wakeup
03:16:47 kernel: [ 7.212338] IPv6: ADDRCONF(NETDEV_UP): eth0: link is not ready

03:16:47 kernel: [ 7.258616] brcmfmac: brcmf_add_if: ERROR: netdev:wlan0 already exists
03:16:47 kernel: [ 7.258633] brcmfmac: brcmf_add_if: ignore IF event
03:16:48 kernel: [ 7.319422] IPv6: ADDRCONF(NETDEV_CHANGE): wlan0: link becomes ready

03:16:49 kernel: [ 8.862985] IPv6: ADDRCONF(NETDEV_CHANGE): eth0: link becomes ready
03:16:49 kernel: [ 8.863652] smsc95xx 1-1.1:1.0 eth0: link up, 100Mbps, full-duplex, lpa 0x45E1

Bluetooth interface configuration
03:16:51 kernel: [ 10.802085] Bluetooth: Core ver 2.21
protocol family 31 = Bluetooth (AF_BLUETOOTH)
03:16:51 kernel: [ 10.802160] NET: Registered protocol family 31
03:16:51 kernel: [ 10.802166] Bluetooth: HCI device and connection manager initialized
03:16:51 kernel: [ 10.802188] Bluetooth: HCI socket layer initialized
03:16:51 kernel: [ 10.802200] Bluetooth: L2CAP socket layer initialized
03:16:51 kernel: [ 10.802252] Bluetooth: SCO socket layer initialized
03:16:51 kernel: [ 10.820862] Bluetooth: HCI UART driver ver 2.3
03:16:51 kernel: [ 10.820877] Bluetooth: HCI UART protocol H4 registered
03:16:51 kernel: [ 10.820882] Bluetooth: HCI UART protocol Three-wire (H5) registered
03:16:51 kernel: [ 10.820983] Bluetooth: HCI UART protocol BCM registered
03:16:51 kernel: [ 11.183166] Bluetooth: BNEP (Ethernet Emulation) ver 1.3
03:16:51 kernel: [ 11.183183] Bluetooth: BNEP filters: protocol multicast
03:16:51 kernel: [ 11.183202] Bluetooth: BNEP socket layer initialized

systemd now takes over aiming for "default.target" which is a link to "graphical.target"
03:16:47 systemd[1]: Mounted Configuration File System.
03:16:47 systemd[1]: Mounted FUSE Control File System.
03:16:47 systemd[1]: Started Create Static Device Nodes in /dev.
03:16:47 systemd[1]: Started Apply Kernel Variables.
03:16:47 systemd[1]: Starting udev Kernel Device Manager...
03:16:47 systemd[1]: Started udev Kernel Device Manager.
03:16:47 systemd[1]: Starting Copy rules generated while the root was ro...
03:16:47 systemd[1]: Starting LSB: Set preliminary keymap...
03:16:47 systemd[1]: Starting LSB: Tune IDE hard disks...
03:16:47 systemd[1]: Started Copy rules generated while the root was ro.
03:16:47 systemd[1]: Started LSB: Tune IDE hard disks.
03:16:47 systemd[1]: Started LSB: Set preliminary keymap.
03:16:47 systemd[1]: Started Show Plymouth Boot Screen.
03:16:47 systemd[1]: Starting Dispatch Password Requests to Console Directory Watch.
03:16:47 systemd[1]: Started Dispatch Password Requests to Console Directory Watch.
03:16:47 systemd[1]: Starting Paths.
03:16:47 systemd[1]: Reached target Paths.
03:16:47 systemd[1]: Started Forward Password Requests to Plymouth Directory Watch.
03:16:47 systemd[1]: Starting Remount Root and Kernel File Systems...
03:16:47 systemd[1]: Started Remount Root and Kernel File Systems.
03:16:47 systemd[1]: Starting Sound Card.
03:16:47 systemd[1]: Reached target Sound Card.
03:16:47 systemd[1]: Started Various fixups to make systemd work better on Debian.
03:16:47 systemd[1]: Starting Load/Save Random Seed...
03:16:47 systemd[1]: Starting Local File Systems (Pre).
03:16:47 systemd[1]: Reached target Local File Systems (Pre).
03:16:47 systemd[1]: Found device /dev/mmcblk0p1.
03:16:47 systemd[1]: Starting File System Check on /dev/mmcblk0p1...
03:16:47 systemd[1]: Started Load/Save Random Seed.
03:16:47 systemd[1]: Started File System Check on /dev/mmcblk0p1.
03:16:47 systemd[1]: Starting system-systemd\x2drfkill.slice.
03:16:47 systemd[1]: Created slice system-systemd\x2drfkill.slice.
03:16:47 systemd[1]: Starting Load/Save RF Kill Switch Status of rfkill0...
03:16:47 systemd[1]: Mounting /boot...
03:16:47 systemd[1]: Started Load/Save RF Kill Switch Status of rfkill0.
03:16:47 systemd[1]: Mounted /boot.
03:16:47 systemd[1]: Starting Local File Systems.
03:16:47 systemd[1]: Reached target Local File Systems.
03:16:47 systemd[1]: Starting Tell Plymouth To Write Out Runtime Data...
03:16:47 systemd[1]: Starting Create Volatile Files and Directories...
03:16:47 systemd[1]: Starting LSB: Raise network interfaces...
03:16:47 systemd[1]: Starting Remote File Systems.
03:16:47 systemd[1]: Reached target Remote File Systems.
03:16:47 systemd[1]: Starting Trigger Flushing of Journal to Persistent Storage...
03:16:47 systemd[1]: Starting LSB: Prepare console...
03:16:47 systemd[1]: Starting LSB: Switch to ondemand cpu governor (unless shift key is pressed)...
03:16:47 systemd[1]: Started Tell Plymouth To Write Out Runtime Data.

```

03:16:47 systemd[1]: Started Trigger Flushing of Journal to Persistent Storage.
03:16:47 systemd[1]: Started Create Volatile Files and Directories.
03:16:47 systemd[1]: Starting Update UTMP about System Boot/Shutdown...
03:16:47 systemd[1]: Started LSB: Prepare console.
03:16:47 systemd[1]: Starting LSB: Set console font and keymap...
03:16:47 systemd[1]: Started Update UTMP about System Boot/Shutdown.
03:16:47 systemd[1]: Started LSB: Set console font and keymap.
03:16:47 systemd[1]: Started LSB: Switch to ondemand cpu governor (unless shift key is pressed).
03:16:47 systemd[1]: Started LSB: Raise network interfaces..
03:16:47 systemd[1]: Starting System Initialization.
03:16:47 systemd[1]: Reached target System Initialization.
03:16:47 systemd[1]: Starting Avahi mDNS/DNS-SD Stack Activation Socket.
03:16:47 systemd[1]: Listening on Avahi mDNS/DNS-SD Stack Activation Socket.
03:16:47 systemd[1]: Starting D-Bus System Message Bus Socket.
03:16:47 systemd[1]: Listening on D-Bus System Message Bus Socket.
03:16:47 systemd[1]: Starting Sockets.
03:16:47 systemd[1]: Reached target Sockets.
03:16:47 systemd[1]: Starting Daily Cleanup of Temporary Directories.
03:16:47 systemd[1]: Started Daily Cleanup of Temporary Directories.
03:16:47 systemd[1]: Starting Timers.
03:16:47 systemd[1]: Reached target Timers.
03:16:47 systemd[1]: Started Manage Sound Card State (restore and store).
03:16:47 systemd[1]: Starting Restore Sound Card State...
03:16:47 systemd[1]: Starting Basic System.
03:16:47 systemd[1]: Reached target Basic System.
03:16:47 systemd[1]: Starting dhcpd on all interfaces...
03:16:47 systemd[1]: Starting Regular background program processing daemon...
03:16:47 systemd[1]: Started Regular background program processing daemon.
03:16:47 systemd[1]: Starting Configure Bluetooth Modems connected by UART...
03:16:47 systemd[1]: Starting Login Service...
03:16:47 systemd[1]: Started getty on tty2-tty6 if dbus and logind are not available.
03:16:47 systemd[1]: Starting LSB: triggerhappy hotkey daemon...
03:16:47 systemd[1]: Starting dnsmasq - A lightweight DHCP and caching DNS server...
03:16:47 systemd[1]: Starting LSB: Autogenerate and use a swap file...
03:16:47 systemd[1]: Starting Avahi mDNS/DNS-SD Stack...
03:16:47 systemd[1]: Starting D-Bus System Message Bus...
03:16:47 systemd[1]: Started D-Bus System Message Bus.
03:16:47 systemd[1]: Started Avahi mDNS/DNS-SD Stack.
03:16:47 systemd[1]: Starting System Logging Service...
03:16:47 systemd[1]: Starting Permit User Sessions...
03:16:47 systemd[1]: Started Restore Sound Card State.
03:16:47 systemd[1]: Started dhcpd on all interfaces.
03:16:47 systemd[1]: Started LSB: triggerhappy hotkey daemon.
03:16:47 systemd[1]: Started LSB: Autogenerate and use a swap file.
03:16:47 systemd[1]: Started Permit User Sessions.
03:16:47 systemd[1]: Started System Logging Service.
03:16:47 systemd[1]: Starting Light Display Manager...
03:16:47 systemd[1]: Starting Network.
03:16:47 systemd[1]: Reached target Network.
03:16:47 systemd[1]: Starting OpenBSD Secure Shell server...
03:16:47 systemd[1]: Started OpenBSD Secure Shell server.
03:16:47 systemd[1]: Starting /etc/rc.local Compatibility...
03:16:47 systemd[1]: Starting Network is Online.
03:16:47 systemd[1]: Reached target Network is Online.
03:16:47 systemd[1]: Starting LSB: Advanced IEEE 802.11 management daemon...
03:16:47 systemd[1]: Starting LSB: Start NTP daemon...
03:16:47 systemd[1]: Started /etc/rc.local Compatibility.
03:16:47 systemd[1]: Started Login Service.
03:16:47 systemd[1]: Starting Terminate Plymouth Boot Screen...
03:16:47 systemd[1]: Starting Wait for Plymouth Boot Screen to Quit...
03:16:47 systemd[1]: Started dnsmasq - A lightweight DHCP and caching DNS server.
03:16:47 systemd[1]: Started Wait for Plymouth Boot Screen to Quit.
03:16:47 systemd[1]: Started Terminate Plymouth Boot Screen.
03:16:47 systemd[1]: Started LSB: Start NTP daemon.
03:16:47 systemd[1]: Starting Getty on tty1...
03:16:47 systemd[1]: Started Getty on tty1.
03:16:47 systemd[1]: Starting Login Prompts.
03:16:47 systemd[1]: Reached target Login Prompts.
03:16:47 systemd[1]: Starting Host and Network Name Lookups.
03:16:47 systemd[1]: Reached target Host and Network Name Lookups.
03:16:47 systemd[1]: Starting LSB: Apache2 web server...
03:16:48 systemd[1]: Started LSB: Advanced IEEE 802.11 management daemon.
03:16:48 systemd[1]: Started Light Display Manager.
03:16:49 systemd[1]: Started LSB: Apache2 web server.
03:16:49 systemd[1]: Starting user-1000.slice.
03:16:49 systemd[1]: Created slice user-1000.slice.
03:16:49 systemd[1]: Starting User Manager for UID 1000...
03:16:49 systemd[1]: Starting Session c1 of user pi.
03:16:49 systemd[1]: Started Session c1 of user pi.
03:16:49 systemd[1]: Started User Manager for UID 1000.
03:16:51 systemd[1]: Starting Authenticate and Authorize Users to Run Privileged Tasks...
03:16:51 systemd[1]: Started Configure Bluetooth Modems connected by UART.
03:16:51 systemd[1]: Starting Multi-User System.
03:16:51 systemd[1]: Reached target Multi-User System.
03:16:51 systemd[1]: Starting Graphical Interface.
03:16:51 systemd[1]: Reached target Graphical Interface.

```

03:16:51 systemd[1]: Starting Update UTMP about System Runlevel Changes...
03:16:51 systemd[1]: Started Update UTMP about System Runlevel Changes.
03:16:51 systemd[1]: Starting Load/Save RF Kill Switch Status of rfkill1...
03:16:51 systemd[1]: Starting Bluetooth service...
03:16:51 systemd[1]: Started Load/Save RF Kill Switch Status of rfkill1.
03:16:51 systemd[1]: Started Bluetooth service.
03:16:51 systemd[1]: Starting Bluetooth.
03:16:51 systemd[1]: Reached target Bluetooth.
03:16:51 systemd[1]: Started Authenticate and Authorize Users to Run Privileged Tasks.
03:16:51 systemd[1]: Startup finished in 2.198s (kernel) + 8.889s (userspace) = 11.087s.
03:16:51 systemd[1]: Starting Disk Manager...
03:16:51 systemd[1]: Starting Hostname Service...
03:16:52 systemd[1]: Started Disk Manager.
03:16:52 systemd[1]: Started Hostname Service.
03:16:52 systemd[1]: Starting Session c2 of user pi.
03:16:52 systemd[1]: Started Session c2 of user pi.
03:16:52 systemd[1]: Starting RealtimeKit Scheduling Policy Service...
03:16:52 systemd[1]: Started RealtimeKit Scheduling Policy Service.
14:49:26 systemd[1]: Time has been changed
14:49:52 systemd[1]: Starting Session c3 of user pi.
14:49:52 systemd[1]: Started Session c3 of user pi.

Checking filesystems
03:16:47 systemd-fsck[101]: e2fsck 1.42.12 (29-Aug-2014)
03:16:47 systemd-fsck[101]: /dev/mmcb1k0p2: clean, 155543/1911616 files, 1676293/7774592 blocks

Setting fake-hwclock to time last written to /etc/fake-hwclock.data at last shutdown
03:16:47 fake-hwclock[105]: Sun Jul 10 10:16:44 UTC 2016

The module i2c_dev was listed in /etc/modules and presumably required module fuse.
03:16:47 systemd-modules-load[107]: Inserted module 'fuse'
03:16:47 systemd-modules-load[107]: Inserted module 'i2c_dev'

03:16:47 hdparm[142]: Setting parameters of disc: (none).

03:16:47 keyboard-setup[141]: Setting preliminary keymap...done.
03:16:47 kbd[273]: Setting console screen modes.
03:16:47 kbd[273]: setterm: $TERM is not defined.

03:16:47 systemd-udev[218]: failed to execute '/lib/udev/mtp-probe' 'mtp-probe /sys/devices/platform/soc/3f980000.usb/usb1/1-1/1-1.1 1 3': No such file or directory
03:16:47 systemd-udev[237]: failed to execute '/lib/udev/mtp-probe' 'mtp-probe /sys/devices/platform/soc/3f980000.usb/usb1/1-1/1-1.4 1 4': No such file or directory

03:16:47 systemd-fsck[243]: fsck.fat 3.0.27 (2014-11-12)
03:16:47 systemd-fsck[243]: /dev/mmcb1k0p1: 104 files, 2623/8057 clusters

03:16:47 networking[269]: Configuring network interfaces...done.

03:16:47 raspi-config[274]: Checking if shift key is held down: No. Switching to ondemand scaling governor.

03:16:47 console-setup[316]: Setting up console font and keymap...done.

Getting addresses via Dynamic Host Configuration Protocol (DHCP) client
03:16:47 dhcpcd[459]: version 6.7.1 starting
03:16:47 dhcpcd[459]: dev: loaded udev
03:16:47 dhcpcd[459]: eth0: adding address fe80::b1b3:1e75:f393:cc6f
03:16:47 dhcpcd[459]: wlan0: adding address fe80::c837:e9f0:9719:f41f
03:16:47 dhcpcd[459]: forked to background, child pid 472
03:16:47 dhcpcd[472]: eth0: waiting for carrier
03:16:48 dhcpcd[472]: wlan0: waiting for carrier
03:16:48 dhcpcd[472]: wlan0: carrier acquired
03:16:48 dhcpcd[472]: DUID 00:01:00:01:1e:c5:30:59:b8:27:eb:9f:bb:ab
03:16:48 dhcpcd[472]: wlan0: IAID eb:b9:8a:b3
03:16:48 dhcpcd[472]: wlan0: soliciting an IPv6 router
03:16:49 dhcpcd[472]: wlan0: soliciting a DHCP lease
03:16:49 dhcpcd[472]: eth0: carrier acquired
03:16:49 dhcpcd[472]: eth0: IAID eb:ec:df:e6
03:16:49 dhcpcd[472]: eth0: rebinding lease of 192.168.2.13
03:16:49 dhcpcd[472]: eth0: soliciting an IPv6 router
03:16:54 dhcpcd[472]: eth0: leased 192.168.2.13 for 86400 seconds
03:16:54 dhcpcd[472]: eth0: adding route to 192.168.2.0/27
03:16:54 dhcpcd[472]: eth0: adding default route via 192.168.2.3
03:16:59 dhcpcd[472]: wlan0: using IPV4LL address 169.254.214.203
03:16:59 dhcpcd[472]: wlan0: adding route to 169.254.0.0/16
03:17:01 dhcpcd[472]: wlan0: no IPv6 Routers available
03:17:03 dhcpcd[472]: eth0: no IPv6 Routers available

03:16:47 cron[460]: (CRON) INFO (pidfile fd = 3)
03:16:47 cron[460]: (CRON) INFO (Running @reboot jobs)

03:16:51 hciattach[461]: bcm43xx_init
03:16:51 hciattach[461]: Flash firmware /lib/firmware/BCM43430A1.hcd
03:16:51 hciattach[461]: Set Controller UART speed to 921600 bit/s
03:16:51 hciattach[461]: Device setup complete

```



```

Start the dnsmasq daemon that handles domain name service and dynamic host control protocol for the WiFi access point
03:16:47 dnsmasq[465]: dnsmasq: syntax check OK.
03:16:47 dnsmasq[557]: started, version 2.72 cachesize 150
03:16:47 dnsmasq[557]: compile time options: IPv6 GNU-getopt DBus i18n IDN DHCP DHCPv6 no-Lua TFTP contrack ipset auth DNSSEC
loop-detect
03:16:47 dnsmasq-dhcp[557]: DHCP, IP range 192.168.10.20 -- 192.168.10.31, lease time 12h
03:16:47 dnsmasq-dhcp[557]: DHCP, sockets bound exclusively to interface wlan0
03:16:47 dnsmasq[557]: using nameserver 192.168.2.3#53 for domain 192.168.10.6
03:16:47 dnsmasq[557]: no servers found in /var/run/dnsmasq/resolv.conf, will retry
03:16:47 dnsmasq[557]: read /etc/hosts - 8 addresses
03:16:57 dnsmasq[557]: reading /var/run/dnsmasq/resolv.conf
03:16:57 dnsmasq[557]: using nameserver 192.168.2.3#53 for domain 192.168.10.6
03:16:57 dnsmasq[557]: using nameserver 192.168.2.3#53

```

Mount the swap file

```

03:16:47 dphys-swapfile[466]: Starting dphys-swapfile swapfile setup ...
03:16:47 dphys-swapfile[466]: want /var/swap=100MByte, checking existing: keeping it
03:16:47 dphys-swapfile[466]: done.

```

avahi = A daemon for discovering available services on a network. Avahi is a genus of woolly lemurs.

```

03:16:47 avahi-daemon[467]: Found user 'avahi' (UID 105) and group 'avahi' (GID 110).
03:16:47 avahi-daemon[467]: Successfully dropped root privileges.
03:16:47 avahi-daemon[467]: avahi-daemon 0.6.31 starting up.
03:16:47 avahi-daemon[467]: Successfully called chroot().
03:16:47 avahi-daemon[467]: Successfully dropped remaining capabilities.
03:16:47 avahi-daemon[467]: Loading service file /services/udisks.service.
03:16:47 avahi-daemon[467]: Joining mDNS multicast group on interface wlan0.IPv6 with address fe80::c837:e9f0:9719:f41f.
03:16:47 avahi-daemon[467]: New relevant interface wlan0.IPv6 for mDNS.
03:16:47 avahi-daemon[467]: Joining mDNS multicast group on interface wlan0.IPv4 with address 192.168.10.6.
03:16:47 avahi-daemon[467]: New relevant interface wlan0.IPv4 for mDNS.
03:16:47 avahi-daemon[467]: Network interface enumeration completed.
03:16:47 avahi-daemon[467]: Registering new address record for fe80::c837:e9f0:9719:f41f on wlan0.*.
03:16:47 avahi-daemon[467]: Registering new address record for 192.168.10.6 on wlan0.IPv4.
03:16:47 avahi-daemon[467]: Registering HINFO record with values 'ARMV7L'/'LINUX'.
03:16:47 avahi-daemon[467]: Joining mDNS multicast group on interface eth0.IPv6 with address fe80::b1b3:1e75:f393:cc6f.
03:16:47 avahi-daemon[467]: New relevant interface eth0.IPv6 for mDNS.
03:16:47 avahi-daemon[467]: Registering new address record for fe80::b1b3:1e75:f393:cc6f on eth0.*.
03:16:48 avahi-daemon[467]: Server startup complete. Host name is raspberrypi6.local. Local service cookie is 2176173309.
03:16:49 avahi-daemon[467]: Service "raspberrypi6" (/services/udisks.service) successfully established.
03:16:54 avahi-daemon[467]: Joining mDNS multicast group on interface eth0.IPv4 with address 192.168.2.13.
03:16:54 avahi-daemon[467]: New relevant interface eth0.IPv4 for mDNS.
03:16:54 avahi-daemon[467]: Registering new address record for 192.168.2.13 on eth0.IPv4.
03:16:59 avahi-daemon[467]: Registering new address record for 169.254.214.203 on wlan0.IPv4.

```

dbus = Desktop Bus (handles coordination of desktop activities)

```

03:16:47 dbus[470]: [system] Successfully activated service 'org.freedesktop.systemd1'
03:16:51 dbus[470]: [system] Activating via systemd: service name='org.freedesktop.PolicyKit1' unit='polkitd.service'
03:16:51 dbus[470]: [system] Successfully activated service 'org.freedesktop.PolicyKit1'
03:16:51 dbus[470]: [system] Activating via systemd: service name='org.freedesktop.UDisks2' unit='udisks2.service'
03:16:51 dbus[470]: [system] Activating via systemd: service name='org.freedesktop.hostname1' unit='dbus-org.freedesktop.hostname1.service'
rtkit-daemon is a daemon manipulates the scheduling to facilitate "real-time" processes
03:16:51 dbus[470]: [system] Activating via systemd: service name='org.freedesktop.RealtimeKit1' unit='rtkit-daemon.service'
03:16:52 dbus[470]: [system] Successfully activated service 'org.freedesktop.UDisks2'
03:16:52 dbus[470]: [system] Successfully activated service 'org.freedesktop.hostname1'
03:16:52 dbus[470]: [system] Successfully activated service 'org.freedesktop.RealtimeKit1'

```

Starting system logger

```

03:16:47 rsyslogd: [origin software="rsyslogd" swVersion="8.4.2" x-pid="538" x-info="http://www.rsyslog.com"] start

```

Start the daemon that handles the WiFi access point

```

03:16:48 hostapd[613]: Starting advanced IEEE 802.11 management: hostapd.

```

```

03:16:48 lightdm[626]: ** (lightdm:626): WARNING **: Error getting user list from org.freedesktop.Accounts:
GDBus.Error:org.freedesktop.DBUS.Error.ServiceUnknown: The name org.freedesktop.Accounts was not provided by any .service files
03:16:49 lightdm[626]: ** (process:822): WARNING **: Error getting user list from org.freedesktop.Accounts:
GDBus.Error:org.freedesktop.DBUS.Error.ServiceUnknown: The name org.freedesktop.Accounts was not provided by any .service files

```

Setting up Network Time Protocol (setting clock)

```

03:16:47 ntpd[664]: ntpd 4.2.6p5@1.2349-o Mon Nov 2 04:29:47 UTC 2015 (1)
03:16:47 ntpd[680]: proto: precision = 0.521 usec
03:16:47 ntp[620]: Starting NTP server: ntpd.
03:16:47 ntpd[680]: Listen and drop on 0 v4wildcard 0.0.0.0 UDP 123
03:16:47 ntpd[680]: Listen and drop on 1 v6wildcard :: UDP 123
03:16:47 ntpd[680]: Listen normally on 2 lo 127.0.0.1 UDP 123
03:16:47 ntpd[680]: Listen normally on 3 wlan0 192.168.10.6 UDP 123
03:16:47 ntpd[680]: Listen normally on 4 lo ::1 UDP 123
03:16:47 ntpd[680]: peers refreshed
03:16:47 ntpd[680]: Listening on routing socket on fd #21 for interface updates
03:16:48 ntpd[680]: Deferring DNS for 0.debian.pool.ntp.org 1
03:16:48 ntpd[680]: Deferring DNS for 1.debian.pool.ntp.org 1
03:16:48 ntpd[680]: Deferring DNS for 2.debian.pool.ntp.org 1
03:16:48 ntpd[680]: Deferring DNS for 3.debian.pool.ntp.org 1
03:16:48 ntpd[738]: signal_no_reset: signal 17 had flags 4000000
03:16:50 ntpd_intres[738]: host name not found: 0.debian.pool.ntp.org
03:16:50 ntpd_intres[738]: host name not found: 1.debian.pool.ntp.org

```

```

03:16:50 ntpd_intres[738]: host name not found: 2.debian.pool.ntp.org
03:16:50 ntpd_intres[738]: host name not found: 3.debian.pool.ntp.org
03:16:52 ntpd[680]: Listen normally on 5 eth0 fe80::b1b3:1e75:f393:cc6f UDP 123
03:16:52 ntpd[680]: Listen normally on 6 wlan0 fe80::c837:e9f0:9719:f41f UDP 123
03:16:52 ntpd[680]: peers refreshed
03:16:54 ntpd_intres[738]: host name not found: 0.debian.pool.ntp.org
03:16:54 ntpd_intres[738]: host name not found: 1.debian.pool.ntp.org
03:16:54 ntpd_intres[738]: host name not found: 2.debian.pool.ntp.org
03:16:54 ntpd_intres[738]: host name not found: 3.debian.pool.ntp.org
03:16:55 ntpd[680]: Listen normally on 7 eth0 192.168.2.13 UDP 123
03:16:55 ntpd[680]: peers refreshed
03:16:58 ntpd_intres[738]: DNS 0.debian.pool.ntp.org -> 4.53.160.75
03:16:58 ntpd_intres[738]: DNS 1.debian.pool.ntp.org -> 64.79.107.43
03:16:58 ntpd_intres[738]: DNS 2.debian.pool.ntp.org -> 64.6.144.6
03:16:58 ntpd_intres[738]: DNS 3.debian.pool.ntp.org -> 129.6.15.29
03:17:00 ntpd[680]: Listen normally on 8 wlan0 169.254.214.203 UDP 123
03:17:00 ntpd[680]: peers refreshed

Start the apache2 web server
03:16:48 apache2[701]: Starting web server: apache2AH00558: apache2: Could not reliably determine the server's fully qualified domain name, using 192.168.10.6. Set the 'ServerName' directive globally to suppress this message
03:16:49 apache2[701]: .

03:16:49 systemd[830]: Starting Paths.
03:16:49 systemd[830]: Reached target Paths.
03:16:49 systemd[830]: Starting Timers.
03:16:49 systemd[830]: Reached target Timers.
03:16:49 systemd[830]: Starting Sockets.
03:16:49 systemd[830]: Reached target Sockets.
03:16:49 systemd[830]: Starting Basic System.
03:16:49 systemd[830]: Reached target Basic System.
03:16:49 systemd[830]: Starting Default.
03:16:49 systemd[830]: Reached target Default.
03:16:49 systemd[830]: Startup finished in 25ms.
14:49:26 systemd[830]: Time has been changed

03:16:52 org.gtk.Private.AfcVolumeMonitor[864]: Volume monitor alive

03:16:51 polkitd[902]: started daemon version 0.105 using authority implementation `local' version `0.105'

03:16:51 bluetoothd[922]: Bluetooth daemon 5.23
03:16:51 bluetoothd[922]: Starting SDP server
03:16:51 bluetoothd[922]: Bluetooth management interface 1.10 initialized
03:16:51 bluetoothd[922]: Sap driver initialization failed.
03:16:51 bluetoothd[922]: sap-server: Operation not permitted (1)
03:16:53 bluetoothd[922]: Endpoint registered: sender=:1.15 path=/MediaEndpoint/A2DPSource
03:16:53 bluetoothd[922]: Endpoint registered: sender=:1.15 path=/MediaEndpoint/A2DPSink
03:16:53 bluetoothd[922]: Endpoint unregistered: sender=:1.15 path=/MediaEndpoint/A2DPSource
03:16:53 bluetoothd[922]: Endpoint unregistered: sender=:1.15 path=/MediaEndpoint/A2DPSink

03:16:51 udisksd[929]: udisks daemon version 2.1.3 starting
03:16:52 udisksd[929]: Acquired the name org.freedesktop.UDisks2 on the system message bus

03:16:53 pulseaudio[933]: org.bluez.Manager.GetProperties() failed: org.freedesktop.DBus.Error.UnknownMethod: Method "GetProperties" with signature "" on interface "org.bluez.Manager" doesn't exist

03:16:52 systemd-hostnamed[938]: Warning: nss-myhostname is not installed. Changing the local hostname might make it unresolveable. Please install nss-myhostname!

03:16:52 rtkit-daemon[965]: Successfully called chroot.
03:16:52 rtkit-daemon[965]: Successfully dropped privileges.
03:16:52 rtkit-daemon[965]: Successfully limited resources.
03:16:52 rtkit-daemon[965]: Running.
03:16:52 rtkit-daemon[965]: Canary thread running.
03:16:52 rtkit-daemon[965]: Watchdog thread running.
03:16:52 rtkit-daemon[965]: Successfully made thread 933 of process 933 (/usr/bin/pulseaudio) owned by '1000' high priority at nice level -11.
03:16:52 rtkit-daemon[965]: Supervising 1 threads of 1 processes of 1 users.

03:17:01 CRON[1160]: (root) CMD ( cd / && run-parts --report /etc/cron.hourly)

03:16:54 rsyslogd-2007: action 'action 17' suspended, next retry is Sun 03:17:24 2016 [try http://www.rsyslog.com/e/2007 ]
14:49:26 rsyslogd-2007: action 'action 17' suspended, next retry is Sun 14:49:56 2016 [try http://www.rsyslog.com/e/2007 ]

```