

RDK-B Boot Time Data Measurement

Boot Time

Booting up a device involves numerous steps and sequences of events. Boot time includes measurement, analysis, human factors, initialization techniques, and reduction techniques. In other words, Boot time is the time from power on to user start.

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Build Procedure – To enable systemd boot measurement tools

- Rpi4 build instructions is available at below links,
[RPI 4B Model Reference Platform](#)
[64bit Arch support for dunfell build in RPI4](#)
- Verify the below systemd bootchart changes at rdk-generic-broadband-image recipe

```
IMAGE_INSTALL += "${SYSTEMD_TOOLS}"  
SYSTEMD_TOOLS = "systemd-analyze systemd-bootchart"
```

- Once the systemd-bootchart is compiled and part of the image, proceed validation.

Generating boot-chart in rpi4

If the `systemd-bootchart.service` disabled, enable and start the service with the `systemctl` commands

```
$ systemctl enable systemd-bootchart
```

```
$ systemctl start systemd-bootchart
```

```
root@RaspberryPi-Gateway:~# systemctl status systemd-bootchart  
systemd-bootchart.service - Boot Process Profiler  
Loaded: loaded (/lib/systemd/system/systemd-bootchart.service; enabled; vendor preset: enabled)  
Active: active (running) since Tue 2021-11-23 10:53:08 UTC; 2s ago  
Docs: man:systemd-bootchart.service(1)  
      man:bootchart.conf(5)  
Main PID: 8672 (systemd-bootcha)  
Tasks: 1 (limit: 4915)  
CGroup: /system.slice/systemd-bootchart.service  
        8672 @lib/systemd/systemd-bootchart -r
```

```
Nov 23 10:53:08 RaspberryPi-Gateway systemd[1]: Started Boot Process Profiler.
```

systemd-analyze

- `systemd-analyze` - shows timing details about the boot process

```
root@RaspberryPi-Gateway:~# systemd-analyze  
Startup finished in 3.120s (kernel) + 49.190s (userspace) = 52.311s  
multi-user.target reached after 49.139s in userspace
```

- `systemd-analyze critical-chain` - prints a tree of the time-critical chain of units

```

root@RaspberryPi-Gateway:~# systemd-analyze critical-chain
The time when unit became active or started is printed after the "@" character.
The time the unit took to start is printed after the "+" character.

multi-user.target @49.139s
webpabroadband.service @46.001s +3.135s
  parodus.service @45.444s +546ms
    ccspwifiagent.service @15.984s +29.437s
      CcspPandMSsp.service @10.556s +5.309s
        PsmSsp.service @9.553s +986ms
          logagent.service @8.384s +1.109s
            CcspCrSsp.service @6.972s +1.364s
              dbus.service @4.815s
                basic.target @4.659s
                  sockets.target @4.629s
                    dbus.socket @4.592s
                      sysinit.target @4.200s
                        systemd-update-done.service @4.136s +35ms
                          systemd-journal-catalog-update.service @3.864s +83ms
                            systemd-tmpfiles-setup.service @3.704s +78ms
                              local-fs.target @3.630s
                                nvram-rdkssa.mount @17.996s
                                  local-fs-pre.target @2.750s
                                    systemd-tmpfiles-setup-dev.service @2.676s +41ms
                                      systemd-sysusers.service @2.394s +238ms
                                        systemd-remount-fs.service @1.814s +277ms
                                          systemd-journald.socket @1.369s
                                            system.slice @608ms
                                              -.slice @608ms

```

- `systemd-analyze blame` - Lists all running units, ordered by the time to initialize

```
root@RaspberryPi-Gateway:~# systemd-analyze blame
29.437s ccspwifiagent.service
11.789s CcspWebUI.service
11.042s hostapd.service
5.309s CcspPandMSsp.service
4.755s utopia.service
3.200s systemd-random-seed.service
3.135s webpabroadband.service
2.389s CcspTelemetry.service
1.950s rdk-oss-ssa-ecfsinit.service
1.944s disable_systemd_restart_param.service
1.696s systemd-logind.service
1.662s snmpd.service
1.603s dev-mmcbk0p2.device
1.364s CcspCrSsp.service
1.338s checkrpiwifisupport.service
1.109s logagent.service
1.041s RdkWanManager.service
986ms PsmSsp.service
803ms user@0.service
691ms dnsmasq.service
681ms ocsp-support.service
597ms systemd-udev-trigger.service
546ms parodus.service
542ms CcspTr069PaSsp.service
423ms dev-mqueue.mount
414ms sys-kernel-debug.mount
403ms tmp.mount
393ms kmod-static-nodes.service
388ms iptables.service
382ms ip6tables.service
374ms ebtables.service
360ms rbus_session_mgr.service
354ms systemd-user-sessions.service
336ms CcspEthAgent.service
322ms CcspTandDSsp.service
306ms sys-kernel-config.mount
294ms systemd-hwdb-update.service
291ms systemd-modules-load.service
287ms systemd-journal-flush.service
277ms systemd-remount-fs.service
269ms sys-fs-fuse-connections.mount
263ms notifyComp.service
256ms ntpd.service
252ms run-postinsts.service
247ms systemd-sysctl.service
240ms swupdate.service
238ms systemd-sysusers.service
166ms systemd-journald.service
151ms CcspLMLite.service
135ms systemd-update-utmp.service
103ms OvsAgent_ovsdb-server.service
91ms RdkFwUpgradeManager.service
89ms systemd-udevd.service
84ms systemd-machine-id-commit.service
83ms systemd-journal-catalog-update.service
78ms systemd-tmpfiles-setup.service
77ms var-volatile.mount
51ms boot.mount
47ms user-runtime-dir@0.service
41ms systemd-tmpfiles-setup-dev.service
38ms systemd-update-utmp-runlevel.service
35ms systemd-update-done.service
20ms rdkbLogMonitor.service
```

systemd-bootchart

Graph Location: graph is generated and stored in /run/log by default

```
root@RaspberryPi-Gateway:/run/log# ls
bootchart-20211123-1053.svg  journal
```

Graph Format : SVG format

