“Smart” Vacuum Cleaners

An Audit Into The Security and Integrity of IoT Systems

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Statement

How have manufacturers of IoT / smart home devices addressed the increasing concerns of digital privacy and product security?

Proposal

Digital Privacy

Investigate the nature of network data (i.e. content, frequency, destination) from the Roborock S6, and how the data is used.

Product Security

Investigate potential security vulnerabilities of the Roborock S6, and assess the effectiveness of current security fortifications.

Work

Current Findings

Relate back to the question about security / privacy

Fingerprinting

```
[ 0.340]U-Boot 2011.09-rc1-dirty (Mar 25 2020 - 20:45:43) Allwinner Technology
[ 0.000000] Linux version 3.4.39 (rockrobo@apimg) (gcc version 4.8.4 (Ubuntu/Linaro 4.8
[ 0.000000] CPU: ARMv7 Processor [410fc075] revision 5 (ARMv7), cr=10c5387d
[ 0.000000] Machine: sun8i
```

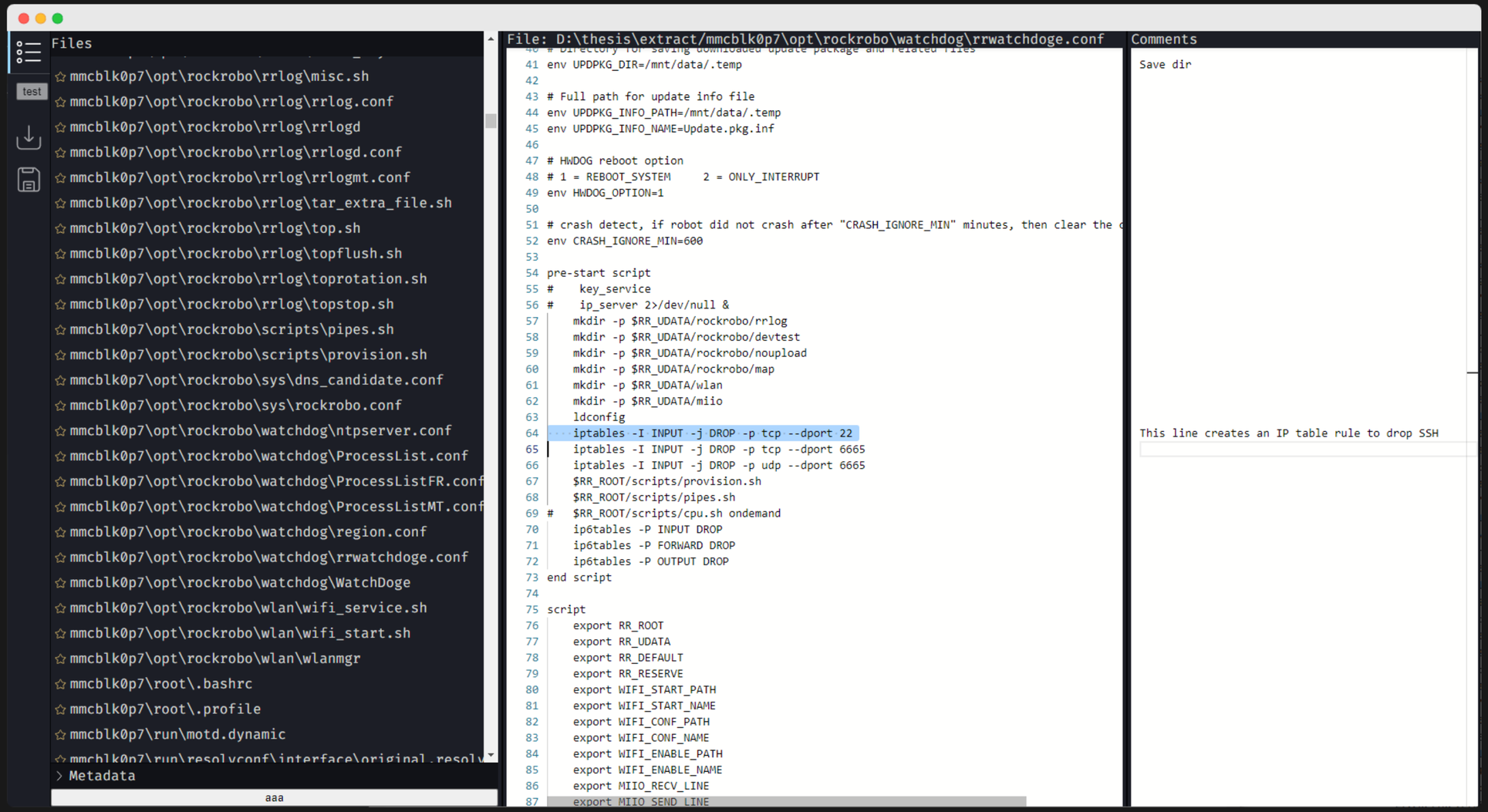
https://en.wikipedia.org/wiki/Linaro

ROBOROCK_VERSION=3.5.4_1558

Ubuntu 14.04.3 LTS

Commentree

Documentation tool



Persistence!

Copying the password is annoying (don’t want to change it either)

```
ssh-copy-id -i ~/.ssh/id_rsa root@10.10.10.8
```

```
--------fastboot partitions--------
-total partitions:9-
-name-          -start-       -size-
boot-res    : 1000000       800000
env         : 1800000       1000000
app (ro)    : 2800000       4000000
recovery    : 6800000       20000000
system_a    : 26800000      20000000
system_b    : 46800000      20000000
Download    : 66800000      21000000
reserve     : 87800000      1000000
UDISK       : 88800000      0
-----------------------------------
```

```
root@rockrobo:/home# fdisk -l

Disk /dev/mmcblk0: 3959 MB, 3959422976 bytes
1 heads, 16 sectors/track, 483328 cylinders, total 7733248 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00000000

        Device Boot      Start         End      Blocks   Id  System
/dev/mmcblk0p1   *     4513792     7782399     1634304    b  W95 FAT32
/dev/mmcblk0p2           73728       90111        8192    6  FAT16
/dev/mmcblk0p3               1     4423680     2211840    5  Extended
/dev/mmcblk0p5           90112      122879       16384   83  Linux
/dev/mmcblk0p6          122880      253951       65536   83  Linux
/dev/mmcblk0p7          253952     1302527      524288   83  Linux
/dev/mmcblk0p8         1302528     2351103      524288   83  Linux
/dev/mmcblk0p9         2351104     3399679      524288   83  Linux
/dev/mmcblk0p10        3399680     4481023      540672   83  Linux
/dev/mmcblk0p11        4481024     4513791       16384   83  Linux
```

```
root@rockrobo:/# cat /etc/fstab
# UNCONFIGURED FSTAB FOR BASE SYSTEM
tmpfs /tmp tmpfs size=30m 0 0
tmpfs /run/shm tmpfs size=100m 0 0
/dev/mmcblk0p1      /mnt/data/              ext4  defaults 0 0
/dev/mmcblk0p6      /mnt/default/               ext4  ro 0 0
/dev/mmcblk0p10     /mnt/updbuf/                ext4  defaults 0 0
/dev/mmcblk0p11     /mnt/reserve/               ext4  defaults 0 0
```

app (/mnt/default) is ro system_a ->

Behaviour

The battery ()

Project Timeline

Thesis A

- Initial research and research environment setup
- Teardown and initial hands-on of Roborock S6

Thesis B - Binary Assessment

- Disassembly and analysis of firmware binaries to identify vulnerabilities
  - inc. ADB binary functionality
- Search for unsecured secrets, logs, configurations

Thesis C - Connectivity Assessment

[Static] Binary assessment

Retrospective of this term

- Time management
- Work
- COVID-19

In the mean time

Findings

Project Plan

Revised Project Plan

Next Steps

- Dump the firmware and begin RE / forensics
- Redo (and further investigate) live system analysis
  - i.e. Properly capture *all* network traffic

Any Questions?

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