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Battery Historian is a tool to analyze battery consumers using Android "bugreport" files.

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wearable	Android 7.1 Developer Preview update of Battery Historian	6 months ago
LICENSE	Updating Battery Historian.	a year ago
README.md	Adding instructions for setup with Docker.	5 months ago
regen_proto.sh	External release of Battery Historian 2.0.	2 years ago
setup.go	Fixing some issues in the setup script.	a year ago

README.md

Battery Historian

Battery Historian is a tool to inspect battery related information and events on an Android device running Android 5.0 Lollipop (API level 21) and later, while the device was not plugged in. It allows application developers to visualize system and application level events on a timeline with panning and zooming functionality, easily see various aggregated statistics since the device was last fully charged, and select an application and inspect the metrics that impact battery specific to the chosen application. It also allows an A/B comparison of two bugreports, highlighting differences in key battery related metrics.

Getting Started

Using Docker

Install Docker.

Run the Battery Historian image. Choose a port number and replace `<port>` with that number in the commands below:

```
docker -- run -p <port>:9999 gcr.io/android-battery-historian:2.1 --port 9999
```

For Linux and Mac OS X:

- That's it, you're done! Historian will be available at http://localhost:&lt;port>.

For Windows:

- You may have to enable Virtualization in your BIOS.
- Once you start Docker, it should tell you the IP address of the machine it is using. If, for example, the IP address is 123.456.78.90, Historian will be available at http://123.456.78.90:&lt;port>.

For more information about the port forwarding, see the Docker documentation.

Building from source code

If you are new to the Go programming language:

- Follow the instructions available at http://golang.org/doc/install for downloading and installing the Go compilers, tools, and libraries.
- Create a workspace directory according to the instructions at http://golang.org/doc/code.html#Organization.
- Ensure that `GOPATH` and `GOBIN` environment variables are appropriately set and added to your `$PATH` environment variable. `$GOBIN should be set to $GOPATH/bin`.
    - For Windows, you may set environment variables through the "Environment Variables" button on the "Advanced" tab of the "System" control panel. Some versions of Windows provide this control panel through the "Advanced System Settings" option inside the "System" control panel.
    - For Linux and Mac OS X, you can add the following lines to your ~/.bashrc or ~/.profile files (assuming your workspace is $HOME/work):

    ```
    export GOPATH=$HOME/work
    export GOBIN=$GOPATH/bin
    export PATH=$PATH:$GOBIN
    ```

Next, install Git from https://git-scm.com/downloads if it's not already installed.

Next, make sure Python 2.7 (NOT Python 3!) is installed. See https://python.org/downloads if it isn't, and ensure that python is added to your `$PATH` environment variable.

Next, install Java from http://www.oracle.com/technetwork/java/javase/downloads/index.html.

Next, download the Battery Historian code and its dependencies:

```
$ go get -d -u github.com/google/battery-historian/...
```

Finally, run Battery Historian!

```
$ cd $GOPATH/src/github.com/google/battery-historian
```

```
# Compile Javascript files using the Closure compiler
$ go run setup.go

# Run Historian on your machine (make sure $PATH contains $GOBIN)
$ go run cmd/battery-historian/battery-historian.go [--port <default:9999>]
```

Remember, you must always run battery-historian from inside the `$GOPATH/src/github.com/google/battery-historian` directory:

```
cd $GOPATH/src/github.com/google/battery-historian
go run cmd/battery-historian/battery-historian.go [--port <default:9999>]
```

How to take a bug report

To take a bug report from your Android device, you will need to enable USB debugging under `Settings > System > Developer Options`. On Android 4.2 and higher, the Developer options screen is hidden by default. You can enable this by following the instructions here.

To obtain a bug report from your development device running Android 7.0 and higher:

```
$ adb bugreport bugreport.zip
```

For devices 6.0 and lower:

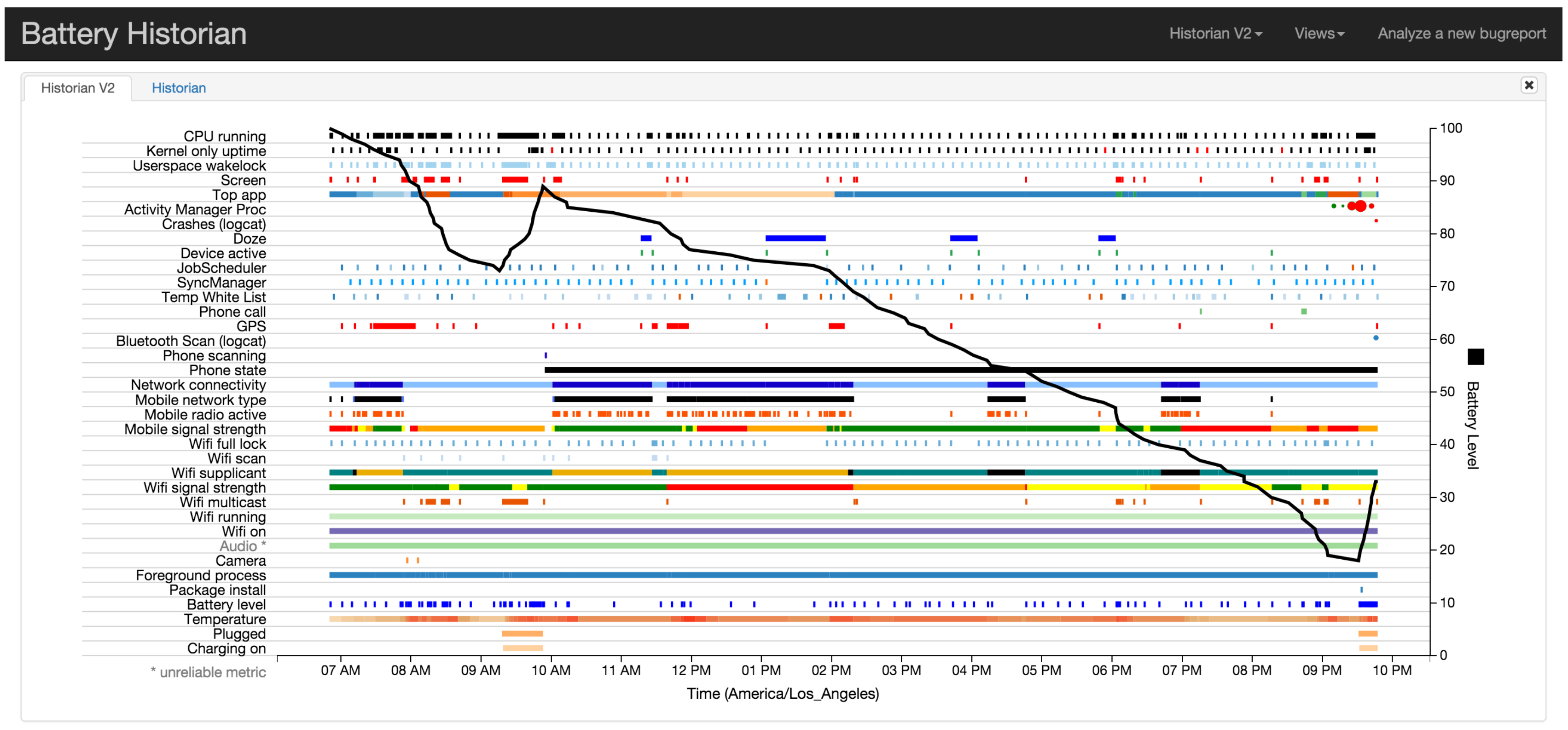
```
$ adb bugreport > bugreport.txt
```

Start analyzing!

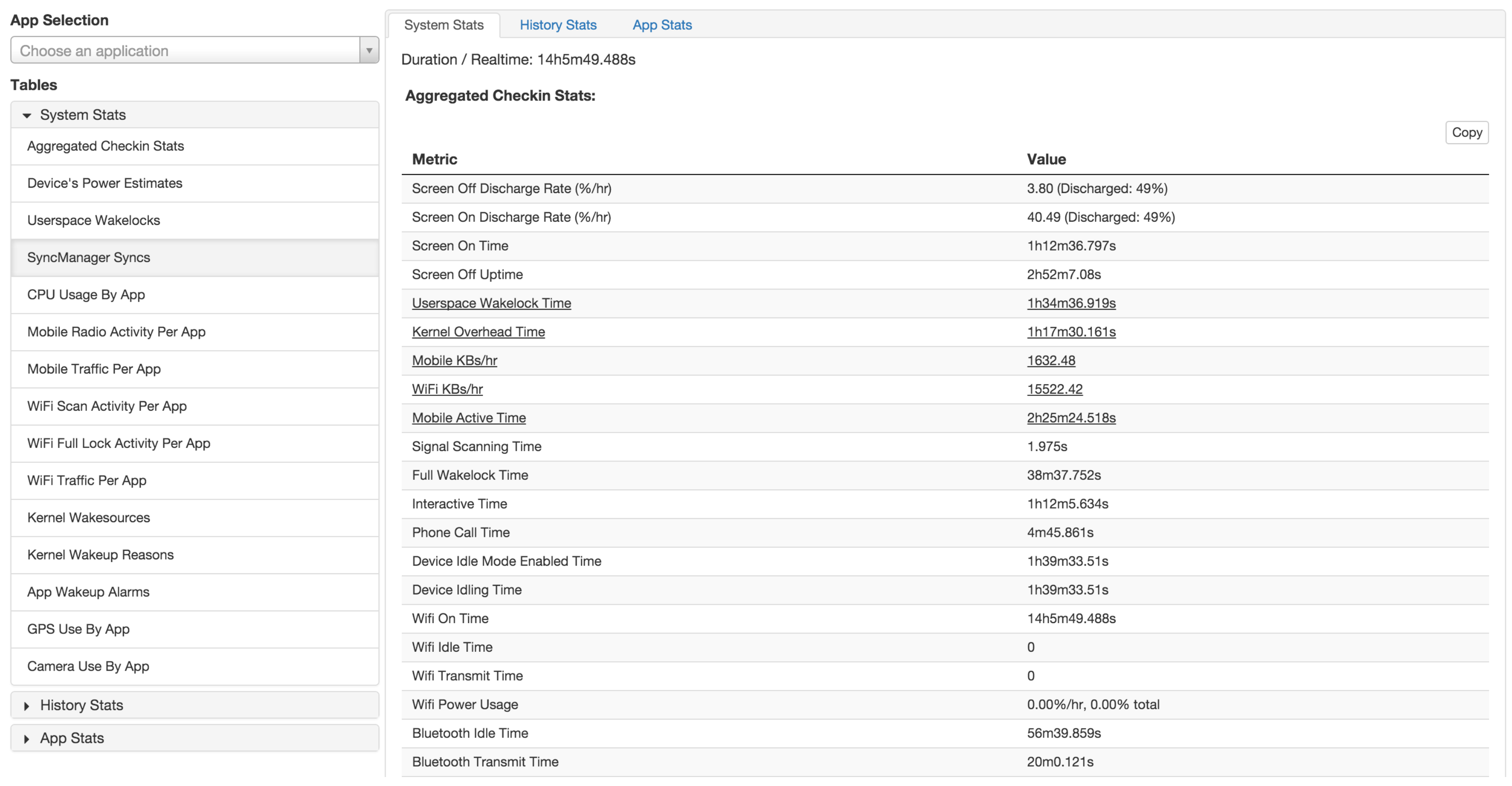
You are all set now. Run `historian` and visit http://localhost:9999 and upload the `bugreport.txt` file to start analyzing.

Screenshots

Timeline:



System stats:

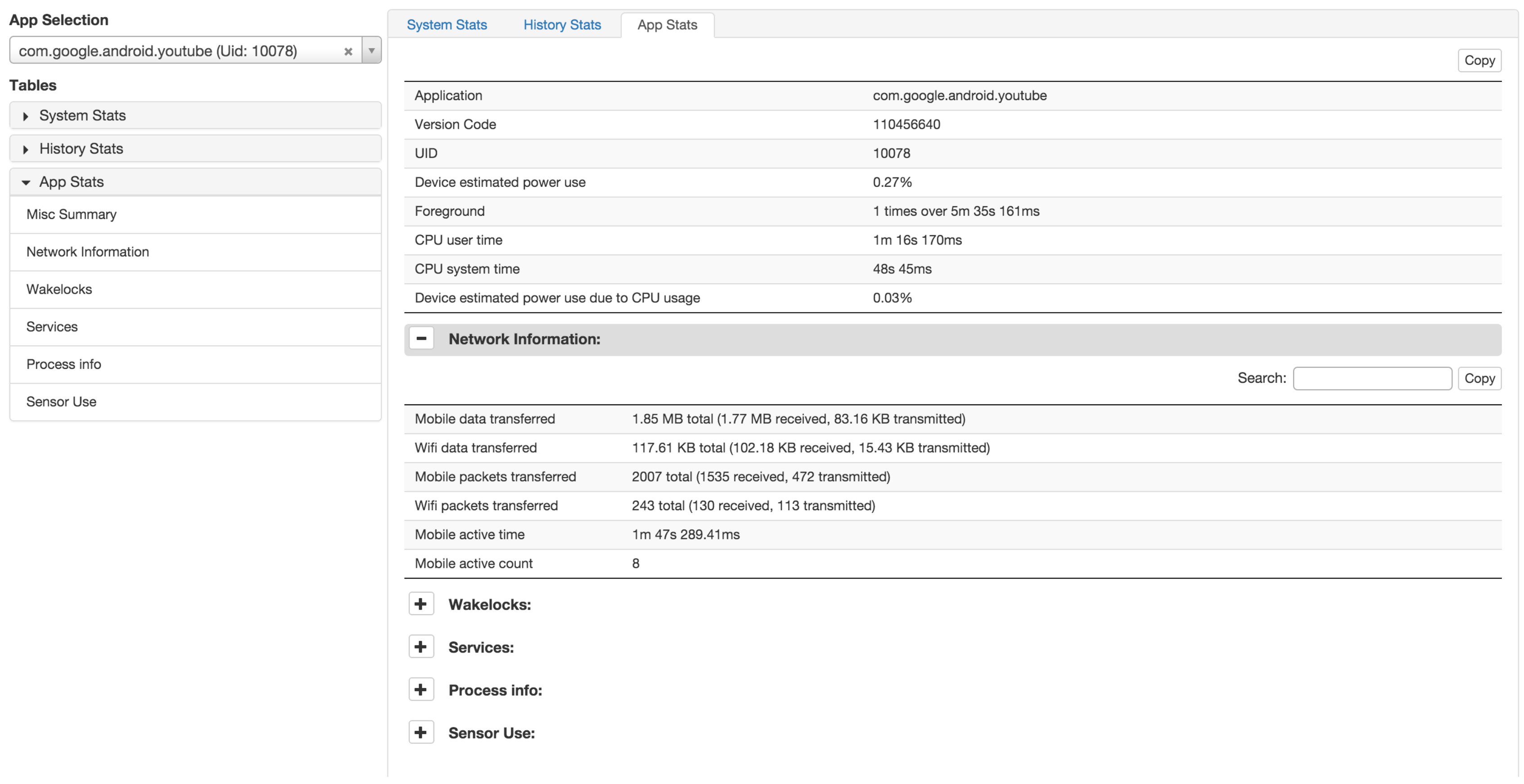


Duration / Realtime: 14h5m49.488s

Aggregated Checkin Stats:

Metric	Value
Screen Off Discharge Rate (%/hr)	3.80 (Discharged: 49%)
Screen On Discharge Rate (%/hr)	40.49 (Discharged: 49%)
Screen On Time	1h12m36.797s
Screen Off Uptime	2h52m7.08s
Userspace Wakelock Time	1h34m36.919s
Kernel Overhead Time	1h17m30.161s
Mobile KBs/hr	1632.48
WiFi KBs/hr	15522.42
Mobile Active Time	2h25m24.518s
Signal Scanning Time	1.975s
Full Wakelock Time	38m37.752s
Interactive Time	1h12m5.634s
Phone Call Time	4m45.861s
Device Idle Mode Enabled Time	1h39m33.51s
Device Idling Time	1h39m33.51s
Wifi On Time	14h5m49.488s
Wifi Idle Time	0
Wifi Transmit Time	0
Wifi Power Usage	0.00%/hr, 0.00% total
Bluetooth Idle Time	56m39.859s
Bluetooth Transmit Time	20m0.121s

App stats:



Application	com.google.android.youtube
Version Code	110456640
UID	10078
Device estimated power use	0.27%
Foreground	1 times over 5m 35s 161ms
CPU user time	1m 16s 170ms
CPU system time	48s 45ms
Device estimated power use due to CPU usage	0.03%

Network Information:

Mobile data transferred	1.85 MB total (1.77 MB received, 83.16 KB transmitted)
Wifi data transferred	117.61 KB total (102.18 KB received, 15.43 KB transmitted)
Mobile packets transferred	2007 total (1535 received, 472 transmitted)
Wifi packets transferred	243 total (130 received, 113 transmitted)
Mobile active time	1m 47s 289.41ms
Mobile active count	8

Wakelocks:

Services:

Process info:

Sensor Use:

Advanced

To reset aggregated battery stats and history:

```
adb shell dumpsys batterystats --reset
```

Wakelock analysis

By default, Android does not record timestamps for application-specific userspace wakelock transitions even though aggregate statistics are maintained on a running basis. If you want Historian to display detailed information about each individual wakelock on the timeline, you should enable full wakelock reporting using the following command before starting your experiment:

```
adb shell dumpsys batterystats --enable full-wake-history
```

Note that by enabling full wakelock reporting the battery history log overflows in a few hours. Use this option for short test runs (3-4 hrs).

Kernel trace analysis

To generate a trace file which logs kernel wakeup source and kernel wakelock activities:

First, connect the device to the desktop/laptop and enable kernel trace logging:

```
$ adb root
$ adb shell

# Set the events to trace.
$ echo "power:wakeup_source_activate" >> /d/tracing/set_event
$ echo "power:wakeup_source_deactivate" >> /d/tracing/set_event

# The default trace size for most devices is 1MB, which is relatively low and might cause the logs to overf
# 8MB to 10MB should be a decent size for 5-6 hours of logging.

$ echo 8192 > /d/tracing/buffer_size_kb

$ echo 1 > /d/tracing/tracing_on
```

Then, use the device for intended test case.

Finally, extract the logs:

```
$ echo 0 > /d/tracing/tracing_on
$ adb pull /d/tracing/trace <some path>

# Take a bug report at this time.
$ adb bugreport > bugreport.txt
```

Note:

Historian plots and relates events in real time (PST or UTC), whereas kernel trace files logs events in jiffies (seconds since boot time). In order to relate these events there is a script which approximates the jiffies to utc time. The script reads the UTC times logged in the dmesg when the system suspends and resumes. The scope of the script is limited to the amount of timestamps present in the dmesg. Since the script uses the dmesg log when the system suspends, there are different scripts for each device, with the only difference being the device-specific dmesg log it tries to find. These scripts have been integrated into the Battery Historian tool itself.

Powermonitor analysis

Powermonitor files should have the following format per line:

```
<timestamp in epoch seconds> <amps>
```

Entries from the powermonitor file will be overlaid on top of the timeline plot.

To ensure the powermonitor and bug report timelines are somewhat aligned, please reset the batterystats before running any powermonitor logging:

```
adb shell dumpsys batterystats --reset
```

And take a bug report soon after stopping powermonitor logging.

If using a Monsoon:

Download the AOSP Monsoon Python script from https://android.googlesource.com/platform/cts/+/master/tools/utils/monsoon.py

```
# Run the script.
$ monsoon.py --serialno 2294 --hz 1 --samples 100000 -timestamp | tee monsoon.out

# ...let device run a while...

$ stop monsoon.py
```

Modifying the proto files

If you want to modify the proto files (pb/*/*.proto), first download the additional tools necessary:

Install the standard C++ implementation of protocol buffers from https://github.com/google/protobuf/blob/master

/src/README.md

Download the Go proto compiler:

```
$ go get -u github.com/golang/protobuf/protoc-gen-go
```

The compiler plugin, protoc-gen-go, will be installed in $GOBIN, which must be in your $PATH for the protocol compiler, protoc, to find it.

Make your changes to the proto files.

Finally, regenerate the compiled Go proto output files using `regen_proto.sh`.

Other command line tools

```
# System stats
$ go run cmd/checkin-parse/local_checkin_parse.go --input=bugreport.txt

# Timeline analysis
$ go run cmd/history-parse/local_history_parse.go --summary=totalTime --input=bugreport.txt

# Diff two bug reports
$ go run cmd/checkin-delta/local_checkin_delta.go --input=bugreport_1.txt,bugreport_2.txt
```

Support

- G+ Community (Discussion Thread: Battery Historian): https://plus.google.com/b/108967384991768947849/communities/114791428968349268860

If you've found an error in this sample, please file an issue: https://github.com/google/battery-historian/issues

License