

DEBIAN - HOW TO MONITOR BATTERY CAPACITY

Recently battery in my notebook started to behave erratically. It will charge only to 70-80% of its maximum capacity. I suspect that it is probably slowly dying so I will have to replace it soon but at first I will look at a several of utilities to monitor battery capacity.

sysfs

You can easily get battery status using *sysfs* file system without any additional utilities.

```
$ ls /sys/class/power_supply/BAT0/
alarm          current_now    model_name     status         uevent
charge_full    cycle_count   power          subsystem      voltage_min_design
charge_full_design device        present       technology     voltage_now
charge_now      manufacturer  serial_number  type
$ cat /sys/class/power_supply/BAT0/charge_full_design
5856000
$ cat /sys/class/power_supply/BAT0/charge_full
4785000
$ cat /sys/class/power_supply/BAT0/charge_now
2206000
$ cat /sys/class/power_supply/BAT0/status
```

Charging

ACPI utilities

ACPI utilities will provide information in more user friendly form:

```
$ acpi -bi
```

```
Battery 0: Charging, 50%, 01:44:12 until charged
```

```
Battery 0: design capacity 5856 mAh, last full capacity 4785 mAh = 81%
```

```
$ acpitool -B
```

```
Battery #1 : present
```

```
Remaining capacity : unknown, 50.14%, 01:44:20
```

```
Design capacity : 5856 mA
```

```
Last full capacity : 4785 mA, 81.71% of design capacity
```

```
Capacity loss : 18.29%
```

```
Present rate : 1372 mA
```

```
Charging state : Charging
```

```
Battery type : Li-ion
```

```
Model number : Dell
```

```
Serial number : 2372
```

IBAM

Intelligent Battery Monitor uses statistical and adaptive linear methods to provide accurate estimations of minutes of battery left or of the time needed until full recharge.

To install *ibam* execute command:

```
$ sudo apt-get install ibam
```

To view graphs you need to install *gnuplot-qt* (KDE) or *gnuplot-x11* package:

```
$ sudo apt-get install gnuplot-qt
```

Edit */etc/rc.local* file as root and add commands:

```
#!/bin/sh -e

# IBAM for milosz desktop user

watch -n 60 su milosz -c ibam > /dev/null &

exit 0
```

After system reboot statistics will be collected every minute as *milosz* user so replace *milosz* with your username.

To monitor battery capacity execute command:

```
$ ibam -ra

Bios percentage:      58 %
Battery percentage:   66 %
Soft low percentage limit: 5 %
Charge percentage:    58 %
Bios time left:       1:28:32
```

Battery time left: 1:55:47

Adapted battery time left: 1:32:53

Charge time left: 1:24:51

Adapted charge time left: 1:45:46

Total battery time: 2:55:36

Adapted total battery time: 2:20:53

Total charge time: 3:23:28

Adapted total charge time: 4:13:37

Profile logging enabled.

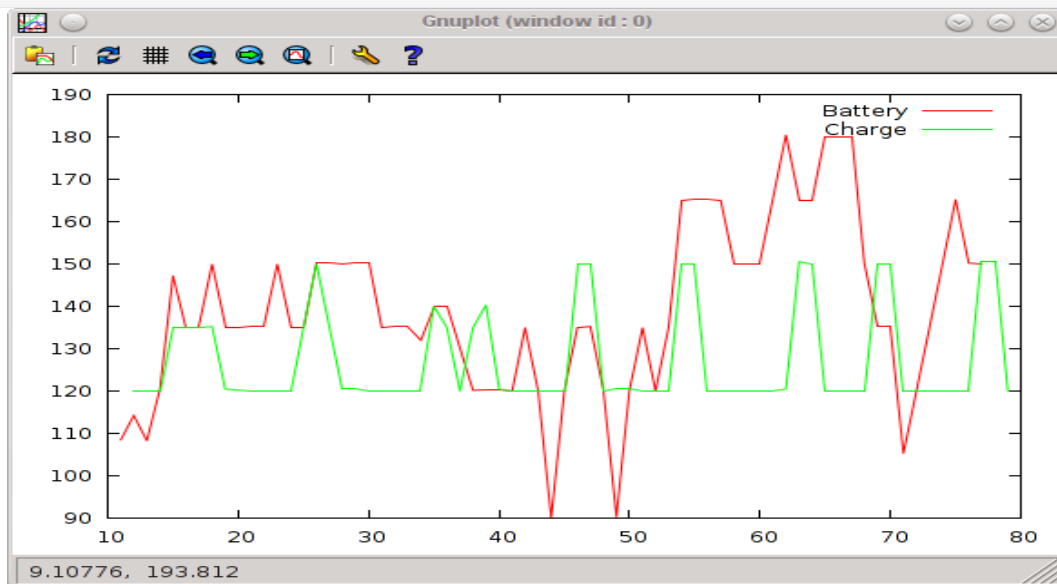
Current file: /home/milosz/.ibam/profile-001-charge

To view battery graph execute command:

```
$ ibam -r --plot
```

Charge time left: 2:25:06

Adapted charge time left: 2:23:04



battery-stats

It didn't work for me because of `init_acpi_acadapd()` returned `NOT_SUPPORTED` bug.

RRDtool

You can graph battery capacity (or even all available data) using `rrdtool` although it requires a little bit more research.

To install `rrdtool` execute command:

```
$ sudo apt-get install rrdtool
```

I will use `~milosz/.battery` directory to store `rrd` file and shell scripts.

```
$ mkdir ~/.battery
```

Read and take note of the maximum capacity value as it will be used the next step.

```
$ cat /sys/class/power_supply/BAT0/charge_full_design
```

```
5856000
```

Create `rrd` file to store battery statistics. Maximum battery charge value is 5856 mAh so I will use `<0,6000>` mAh as an acceptable range of values. Stored values: one per minute for the first day, one per three minutes for the first week, one per five minutes for the first month.

```
$ rrdtool create ~/.battery/battery_capacity.rrd -s 60 DS:capacity:GAUGE:120:0:6000 \
```

```
RRA:MAX:0.5:1:1440 \  
RRA:MAX:0.5:3:5040 \  
RRA:MAX:0.5:5:8928
```

Create `~/.battery/update_battery_charge.sh` script as it will be used to read and store battery charge value. Modify `rrd_file` for the same reason as earlier.

```
#!/bin/sh  
  
# Update battery charge level  
  
rrd_file="/home/milosz/.battery/battery_capacity.rrd"  
  
charge_now=`cat /sys/class/power_supply/BAT0/charge_now`  
charge_now=`expr ${charge_now} / 1000`  
  
rrdtool update ${rrd_file} N:${charge_now}
```

Set executable bit:

```
$ chmod +x ~/.battery/battery_update_charge.sh
```

Edit `/etc/rc.local` file as root and replace `milosz` with your username. Statistics will be collected every minute as `milosz` user. Execute command directly or reboot system.

```
#!/bin/sh -e
```

```
# Update battery charge level rrd file for milosz desktop user

watch -n 60 su milosz /home/milosz/.battery/update_battery_charge.sh

exit 0
```

To create create nice looking graphs

create `~/.battery/graph_battery_charge.sh` script and
modify `rrd_file` and `destination` variables.

```
#!/bin/sh

# Create "battery charge level" graphs for 1 day, 1 week and 1 month

rrd_file="/home/milosz/.battery/battery_capacity.rrd"

destination="/home/milosz/.battery/"

for period in "1d" "1w" "1m"
do

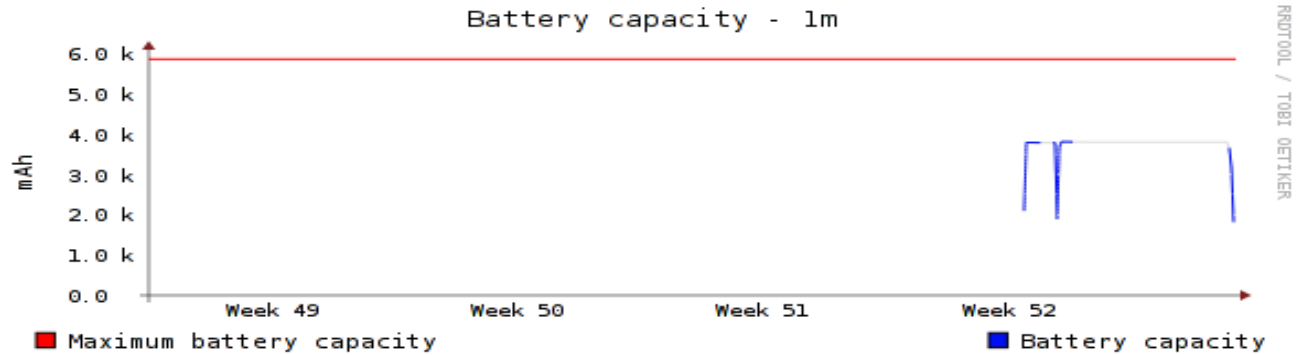
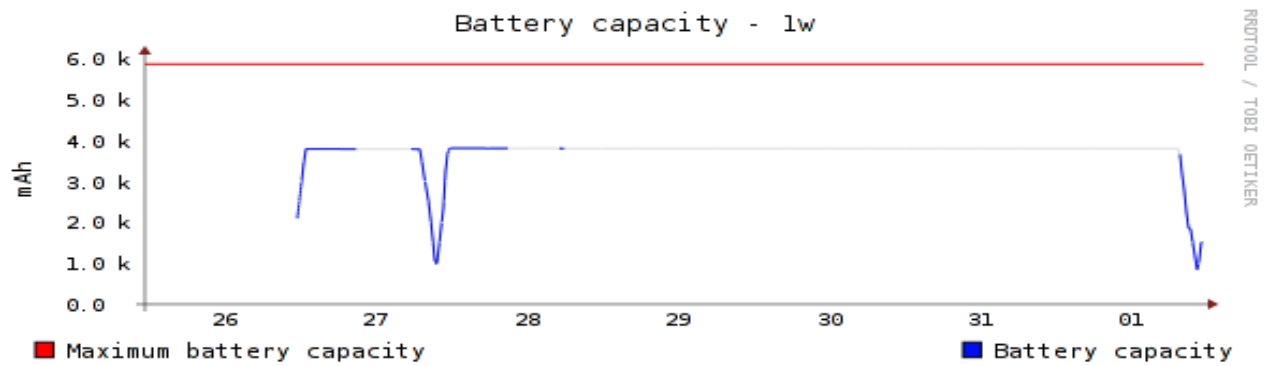
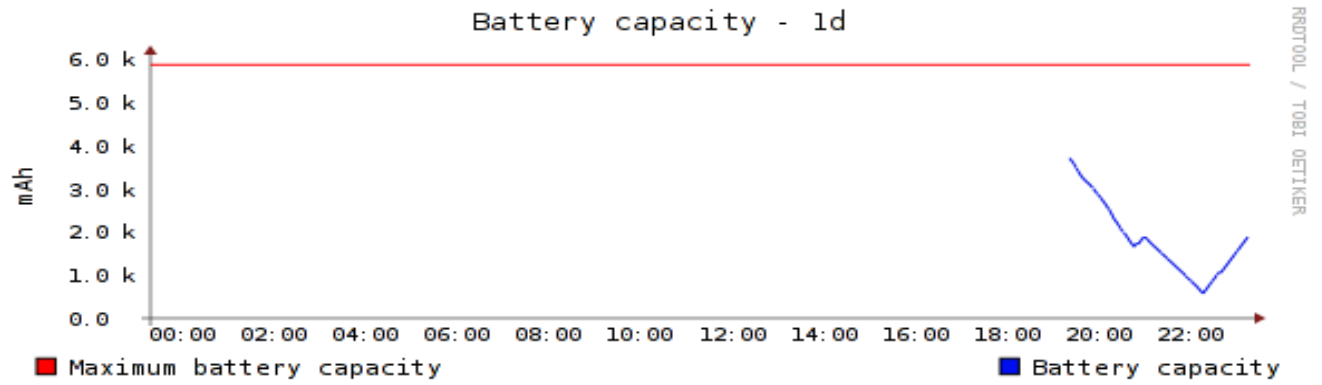
  /usr/bin/rrdtool graph - \
    --imgformat=PNG -N \
    --start=-${period} \
    --end=-60 \
    --title="Battery capacity - ${period}" \
    --rigid \
```

```
--base=1000 \  
  
--full-size-mode \  
  
--height=210 \  
  
--width=590 \  
  
--upper-limit=6000 \  
  
--lower-limit=0 \  
  
--vertical-label="mAh" \  
  
--slope-mode \  
  
--border 0 \  
  
--color BACK#FFFFFF \  
  
--color GRID#FFFFFF \  
  
--color MGRID#FFFFFF \  
  
DEF:a=${rrd_file}:capacity:MAX \  
  
HRULE:5856#FF0000:"Maximum battery capacity" \  
  
CDEF:b=a,UN,PREV,a,IF \  
  
LINE:b#dddddd \  
  
LINE:a#000FF0FF:"Battery capacity" > ${destination}battery_charge_level_${period}.png  
  
done
```

Set executable bit:

```
$ chmod +x ~/.battery/graph_battery_charge.sh
```

Execute it periodically to regenerate battery graphs (use *cron* to automate task) and view at the graphs located in *~/.battery* directory.



Source: <https://blog.sleeplessbeastie.eu/2013/01/02/debian-how-to-monitor-battery-capacity/>