Glen Turner ((http://vk5tu.livejournal.com/profile)**vk5tu** (http://vk5tu.livejournal.com/)) ha scritto,
2013 (http://vk5tu.livejournal.com/2013/)-06 (http://vk5tu.livejournal.com/2013/06/)-06 (http://vk5tu.livejournal.com/2013/06/06/)
21:07:00

Raspberry Pi watchdog timer

If you are using the Raspberry Pi as a server you might want to enable the built-in hardware watchdog. This will automatically reboot the machine if user space fails to periodically write to *ated /dev/watchdog* within a reasonable time.

There are two major tasks. (1) Installing and configuring program to say "hi" to the heartbeat device periodically. (2) The kernel exposing the heartbeat device to users.

The hardware is simple enough. It counts down from *n* down to 0, one tick per second. Upon reaching zero the hardware reboots the machine. If the hardware is tickled then it resets the countdown timer to *n* and the countdown begins anew.

The Linux kernel exposes the hardware countdown timer as */dev/watchdog*. The convention is that the countdown takes 60 seconds.

The Raspberry Pi watchdog runs for less time than this, between 1 and 14 seconds. That's understandable, at its heart the Raspberry Pi has a mobile phone CPU and no one is going to look at the blank screen for a minute wondering what will happen.

User space heart beat - Raspbian

The watchdog(8) daemon is the simplest way for Raspbian to periodically tickle */dev/watchdog*.

```
sudo apt-get install watchdog
update-rc.d watchdog enable
```

The watchdog daemon requires some configuration on the Raspberry Pi. Edit */etc/watchdog.conf* to contain only:

```
watchdog-device = /dev/watchdog
watchdog-timeout = 14
realtime = yes
priority = 1
```

If you want the daemon to consume less CPU you can extend the interval between heart beats. Four seconds still gives three chances per fourteen second interval:

```
interval = 4
```

User space heartbeat - systemd

The great simplification of system utilities by systemd encompasses watchdog timers too. Edit */etc/systemd/system.conf* and set:

```
RuntimeWatchdogSec=14
```

Kernel watchdog device

Configure the kernel to expose the watchdog device. Set the parameters to the kernel module by creating a new file */etc/modprobe.d*

/bcm2708_wdog.conf containing:

```
alias char-major-10-130 bcm2708_wdog
alias char-major-10-131 bcm2708_wdog
options bcm2708_wdog heartbeat=14 nowayout=1
```

- The periodic writes from user space are called "heart beats". The *heartbeat* parameter to the kernel module is the maximum gap between heartbeats seen by the device before the hardware reboots. On the Raspberry Pi this gap can be as large as 14 seconds. That's substantially less than the common value of 60 seconds.

- The *nowayout* parameter determines what happens when the */dev/watchdog* device is closed: is a heartbeat still expected or not? A value of 0 says that no further heart beats are expected. So if the process writing the heartbeats fails then the machine will not reboot, even if that process failing is a sign that the machine is in a poor way. A value of 1 says that the countdown to a reboot keeps running and if the device is not reopened and a heartbeat written then the machine will reboot. The Raspberry Pi does not remove power to itself when halted. So setting *nowayout=1* will reboot the Raspberry Pi about 14 seconds after the completion of **shutdown -h now**.

Normally we would put the module name into */etc/modules*, but what if starting the system takes longer than the fourteen seconds available? Rather than risk a continual reboot we should let udev load the module the first time something opens */dev/watchdog*. Unfortunately I can't figure out how to do that in this case :-(

The second-best option is to install the module just before it is used. The watchdog daemon on Debian allows for this in */etc/default /watchdog*:

```
watchdog_module="bcm2708_wdog"
```

Start watchdog service

This will all take effect at the next reboot, or kick it off without interrupting service with:

```
sudo modprobe bcm2708_wdog
sudo service watchdog start
```

Check watchdog service

Check operation in the system log. Here is the module activating */dev/watchdog*:

```
bcm2708 watchdog, heartbeat=14 sec (nowayout=1)
```

Here is the start of the watchdog daemon which writes the heart beats:

```
watchdog[]: starting daemon (5.12):
watchdog[]: int=4s realtime=yes sync=no soft=no mla=0 mem=0
watchdog[]: ping: no machine to check
watchdog[]: file: no file to check
watchdog[]: pidfile: no server process to check
watchdog[]: interface: no interface to check
watchdog[]: test=none(0) repair=none(0) alive=/dev/watchdog heartbeat=none temp=none to=root
no_act=no
watchdog[]: hardware wartchdog identity: BCM2708
```

TAGS: linux (http://vk5tu.livejournal.com/tag/linux), raspberrypi (http://vk5tu.livejournal.com/tag/raspberrypi)

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Giugno 14 2013, 03:54:54 UTC
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hey glen,

my watchdog seems to work in that if I kill the watchdog process, it reboots, but if I halt the pi, it doesn't.
any ideas?

Jun 14 13:11:17 raspberrypi kernel: [29.656998] bcm2708 watchdog, heartbeat=14 sec (nowayout=1)
Jun 14 13:11:18 raspberrypi wd_keepalive[2378]: starting watchdog keepalive daemon (5.12):
Jun 14 13:11:18 raspberrypi wd_keepalive[2378]: int=4 alive=/dev/watchdog realtime=yes
Jun 14 13:11:18 raspberrypi wd_keepalive[2378]: hardware wartchdog identity: BCM2708
Jun 14 13:11:18 raspberrypi wd_keepalive[2378]: unable to disable oom handling!

Jun 14 13:11:22 raspberrypi kernel: [34.318369] wdt: WDT device closed unexpectedly. WDT will not stop!
Jun 14 13:11:22 raspberrypi wd_keepalive[2378]: stopping watchdog keepalive daemon (5.12)
Jun 14 13:45:54 raspberrypi watchdog[2551]: starting daemon (5.12):
Jun 14 13:45:54 raspberrypi watchdog[2551]: int=4s realtime=yes sync=no soft=no mla=24 mem=1
Jun 14 13:45:54 raspberrypi watchdog[2551]: ping: no machine to check
Jun 14 13:45:54 raspberrypi watchdog[2551]: file: /var/log/syslog:0
Jun 14 13:45:54 raspberrypi watchdog[2551]: pidfile: no server process to check
Jun 14 13:45:54 raspberrypi watchdog[2551]: interface: no interface to check
Jun 14 13:45:54 raspberrypi watchdog[2551]: test=none(0) repair=none(0) alive=/dev/watchdog heartbeat=none temp=none to=root
no_act=no
Jun 14 13:45:54 raspberrypi watchdog[2551]: hardware wartchdog identity: BCM2708

root@raspberrypi:~# egrep -v '#|^$' /etc/watchdog.conf
file = /var/log/syslog
max-load-1 = 24
max-load-5 = 18
max-load-15 = 12
min-memory = 1
watchdog-device = /dev/watchdog
watchdog-timeout = 14
realtime = yes
priority = 1
interval = 4

root@raspberrypi:~# cat /etc/modprobe.d/bcm2708_wdog.conf
alias char-major-10-130 bcm2708_wdog
alias char-major-10-131 bcm2708_wdog
options bcm2708_wdog heartbeat=14 nowayout=1

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Anonymous
Maggio 28 2014, 15:28:37 UTC
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I have the same problem, watchdog seems to work in that if I kill the watchdog process, it reboots, but if I halt the pi, it doesn't. Did you ever find solution for this?

up to date software, latest pi firmware

RISPONDI (HTTP://VK5TU.LIVEJOURNAL.COM/35721.HTML?REPLYTO=23433)

Agosto 31 2013, 18:07:39 UTC
LINK (HTTP://VK5TU.LIVEJOURNAL.COM/35721.HTML?THREAD=1673#T1673)
COLLAPSE (HTTP://VK5TU.LIVEJOURNAL.COM/35721.HTML?THREAD=1673#T1673)

You are an awesome super star!!

Thanks for these excellent instructions! I am constantly grateful when doing development at finding posts like yours!

RISPONDI (HTTP://VK5TU.LIVEJOURNAL.COM/35721.HTML?REPLYTO=1673)

Anonymous
Ottobre 6 2013, 13:55:52 UTC

Hi,   **LINK (HTTP://VK5TU.LIVEJOURNAL.COM/35721.HTML?THREAD=1929#T1929)**
             COLLAPSE (HTTP://VK5TU.LIVEJOURNAL.COM/35721.HTML?THREAD=1929#T1929)

Thanks for the detailed info.

I found that in order to get mine to work, I had to change permissions on /etc/watchdog

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Anonymous
Febbraio 14 2014, 10:04:48 UTC
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COLLAPSE (HTTP://VK5TU.LIVEJOURNAL.COM/35721.HTML?THREAD=10889#T10889)

I'm more than happy to uncover this site. I wanted to
thank you for ones time due to this fantastic read!! I definitely liked every part of it and I have you book-marked to see
new stuff on your blog.

RISPONDI (HTTP://VK5TU.LIVEJOURNAL.COM/35721.HTML?REPLYTO=10889)

Anonymous
Febbraio 19 2014, 23:39:18 UTC
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COLLAPSE (HTTP://VK5TU.LIVEJOURNAL.COM/35721.HTML?THREAD=12425#T12425)

Your way of describing all in this piece of writing is genuinely good, all be
capable of simply understand it, Thanks a lot.

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Anonymous
Febbraio 23 2014, 06:32:25 UTC
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I couldn't resist commenting. Exceptionally well written!

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