Using rsh to run a program on a remote Raspberry Pi

Wouldn't it be nice to be able to run a program on a remote Raspberry Pi on your LAN and to transfer the ouput of that program back into 2.11 BSD? One could for example read data from a <u>remote sensor</u> on a Raspberry Pi Zero or send commands from the Raspberry Pi running the PiDP-11 SIMH simulation to a <u>IoT device</u>. For this, the command rsh exists in Berkley Unix, see <u>Berkeley r-commands</u>.

The problem is, that modern Linux systems such as Raspbian do not allow the r-commands because of the insecure nature of these commands. Instead, ssh is implemented. But ssh is not available on 2.11 BSD. Nevertheless it is possible to enable rsh on a Raspberry Pi. For <u>security reasons</u> this should only be done on a <u>LAN with a proper firewall</u>, and not on any machine on which private data is stored. One could argue that 2.11 BSD as an ancient operating system is anyway insecure, but a Raspberry Pi is a much more powerful and widely used system. The security risks are therefore much higher.

==If you want to communicate between 2.11 BSD and the <u>Raspberry Pi running the 2.11 BSD SIMH simulation</u>, you need to establish TCP/IP communication between this Raspberry Pi and 2.11 BSD, using <u>Proxy ARP</u>. See the corresponding documentation in the PiDP-11 user manual.==

You do not need to use the same user in 2.11 BSD and the remote Raspberry Pi, as long as you only plan to use rsh. If you come to the conclusion that the security risk is acceptable in your case, you can enable rsh in Raspbian as follows:

    sudo apt-get install rsh-server

Then, create a file called .rhosts in the pi home directory with the following content

    bsd_ip_address bsd_user_name

where *bsd_ip_address* is the ip address of your 2.11 BSD, and *bsd_user_name* is the name of the user on 2.11 BSD, which should have access to the Raspberry Pi. In my case, this is

    192.168.1.99 rene

Set proper permissions for this file (without this step things will not work!)

    chmod 600 .rhosts

That's all on the remote Raspberry Pi.

Log in as root to 2.11 BSD and edit /etc/hosts. Add the line

    remote_ip_address remote_full_name remote_nick_name

where *remote_ip_address* is the ip address of the Raspberry Pi and *remote_full_name* and *remote_nick_name* are the respective full and nick names. In my case this line reads

    192.168.1.103 pizerow.home.lan pizerow

Now login as *bsd_user_name* and type the following to test your installation:

    rsh *remote_nick_name* -l pi -n "ls"

You should get a directory listing of /home/pi on the remote Raspberry Pi. If you get a password prompt, something has not been set up properly.

To test something more elaborate, type

    rsh *remote_nick_name* -l pi -n "cat /sys/class/thermal/thermal_zone0/temp"

to get the raw actual cpu temperature of the remote Raspberry Pi.

In the directory rtest in this repository you can find a little C program which shows how to use <u>popen</u> to get this information from within a program, and process it appropriately to produce human readable output in 2.11 BSD. If you are not using pizerow as the *remote_nick_name* you need to change line 20 of rtest.c and recompile the program with "make".

```
rene@pdp11:rtest$ rtest
***************************************************
* The CPU temperature on the pizerow is 42.2 deg C *
***************************************************
rene@pdp11:rtest$
```