WF88 OTA Application Note

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1. Overview

In order to achieve the OTA of WF88, a usage case environment needs to be in place/setup. This includes the necessary service programs, configuration files, and download directory. After completing the environment setup, the firmware file and corresponding script file need to be uploaded to the download directory, and then execute the script to achieve OTA.

2. OTA environment setup

The environment is based on Ubuntu 4.4.0-210 generic version. An account with root privileges is required in the download directory.

2.1. Install tftp-hpa and tftpd-hpa

It is necessary to install the tftp-hpa and tftpd-hpa service programs. Use the following command:

sudo apt-get install tftp-hpa tftpd-hpa

After running this command, the relevant installation prompts are shown below.

root@amped:/home/yangsz# sudo apt-get install tftp-hpa tftpd-hpa

Reading package lists... Done

Building dependency tree

Reading state information... Done

The following packages were automatically installed and are no longer required:

libcap-ng0:i386 libdbus-1-3:i386 libssl1.0.0:i386

Use 'sudo apt autoremove' to remove them.

Suggested packages:

pxelinux

The following packages will be REMOVED:

tftp

The following NEW packages will be installed:

tftp-hpa tftpd-hpa

0 upgraded, 2 newly installed, 1 to remove and 230 not upgraded.

Need to get 57.1 kB of archives.

After this operation, 84.0 kB of additional disk space will be used.

Do you want to continue? [Y/n] y

Get:1 http://cn.archive.ubuntu.com/ubuntu xenial-updates/main amd64 tftp-hpa amd64 5.2+20150808-1ubuntu1.16.04.1 [18.0 kB]

Get:2 http://cn.archive.ubuntu.com/ubuntu xenial-updates/main amd64 tftpd-hpa amd64 5.2+20150808-

1ubuntu1.16.04.1 [39.1 kB]

Fetched 57.1 kB in 6s (8,772 B/s)

Preconfiguring packages ...

(Reading database ... 656630 files and directories currently installed.)

Removing tftp (0.17-18ubuntu2) ...

Processing triggers for man-db (2.7.5-1) ...

Selecting previously unselected package tftp-hpa.

(Reading database ... 656624 files and directories currently installed.)

Preparing to unpack .../tftp-hpa_5.2+20150808-1ubuntu1.16.04.1_amd64.deb ...

Unpacking tftp-hpa (5.2+20150808-1ubuntu1.16.04.1) ...

Selecting previously unselected package tftpd-hpa.

Preparing to unpack .../tftpd-hpa_5.2+20150808-1ubuntu1.16.04.1_amd64.deb ...

Unpacking tftpd-hpa (5.2+20150808-1ubuntu1.16.04.1) ...

Processing triggers for man-db (2.7.5-1) ...

Processing triggers for ureadahead (0.100.0-19) ...

ureadahead will be reprofiled on next reboot

Processing triggers for systemd (229-4ubuntu21.31) ...

Setting up tftp-hpa (5.2+20150808-1ubuntu1.16.04.1) ...

Setting up tftpd-hpa (5.2+20150808-1ubuntu1.16.04.1) ...

Processing triggers for systemd (229-4ubuntu21.31) ...

Processing triggers for ureadahead (0.100.0-19) ...

root@amped:/home/yangsz#

2.2. Install xinetd

It is necessary to install the xinetd service program. Use the following command:

sudo apt-get install xinetd

After running this command, the relevant installation prompts are shown below.

root@amped:/home/yangsz# sudo apt-get install xinetd

Reading package lists... Done

Building dependency tree

Reading state information... Done

The following packages were automatically installed and are no longer required:

* libcap-ng0:i386 libdbus-1-3:i386 libssl1.0.0:i386*

Use 'sudo apt autoremove' to remove them.

The following NEW packages will be installed:

* xinetd*

0 upgraded, 1 newly installed, 0 to remove and 230 not upgraded.

Need to get 107 kB of archives.

After this operation, 299 kB of additional disk space will be used.

Get:1 http://cn.archive.ubuntu.com/ubuntu xenial/main amd64 xinetd amd64 1:2.3.15-6 [107 kB]

Fetched 107 kB in 1s (72.0 kB/s)

Selecting previously unselected package xinetd.

(Reading database ... 656643 files and directories currently installed.)

Preparing to unpack .../xinetd_1%3a2.3.15-6_amd64.deb ...

Unpacking xinetd (1:2.3.15-6) ...

Processing triggers for man-db (2.7.5-1) ...

Processing triggers for doc-base (0.10.7) ...

Processing 1 added doc-base file...

Processing triggers for ureadahead (0.100.0-19) ...

Processing triggers for systemd (229-4ubuntu21.31) ...

Setting up xinetd (1:2.3.15-6) ...

Processing triggers for systemd (229-4ubuntu21.31) ...

Processing triggers for ureadahead (0.100.0-19) ...

root@amped:/home/yangsz#

2.3. Install expect

It is necessary to install the **expect** service program. Use the following command:

sudo apt-get install expect

After running this command, the relevant installation prompts are shown below.

root@amped:/home/yangsz# sudo apt-get install expect

Reading package lists... Done

Building dependency tree

Reading state information... Done

The following packages were automatically installed and are no longer required:

* libcap-ng0:i386 libdbus-1-3:i386 libssl1.0.0:i386*

Use 'apt autoremove' to remove them.

The following additional packages will be installed:

* tcl-expect*

The following NEW packages will be installed:

* expect tcl-expect*

0 upgraded, 2 newly installed, 0 to remove and 230 not upgraded.

Need to get 241 kB of archives.

After this operation, 538 kB of additional disk space will be used.

Do you want to continue? [Y/n] y

Get:1 http://cn.archive.ubuntu.com/ubuntu xenial/universe amd64 tcl-expect amd64 5.45-7 [104 kB]

Get:2 http://cn.archive.ubuntu.com/ubuntu xenial/universe amd64 expect amd64 5.45-7 [137 kB]

Fetched 241 kB in 2s (108 kB/s)

Selecting previously unselected package tcl-expect:amd64.

(Reading database ... 656675 files and directories currently installed.)

Preparing to unpack .../tcl-expect_5.45-7_amd64.deb ...

Unpacking tcl-expect:amd64 (5.45-7) ...

Selecting previously unselected package expect.

Preparing to unpack .../expect_5.45-7_amd64.deb ...

Unpacking expect (5.45-7) ...

Processing triggers for libc-bin (2.23-0ubuntu11.3) ...

Processing triggers for man-db (2.7.5-1) ...

Setting up tcl-expect:amd64 (5.45-7) ...

Setting up expect (5.45-7) ...

Processing triggers for libc-bin (2.23-0ubuntu11.3) ...

root@amped:/home/yangsz#

2.4. Create tftp download directory

For example, create a tftpboot download directory in the /home/yangsz directory.

(1) Create a tftpboot download directory

root@amped:/home/yangsz# mkdir tftpboot

(2) Enter the download directory

root@amped:/home/yangsz# cd tftpboot/

root@amped:/home/yangsz/tftpboot#

(3) Modify the properties of the directory

root@amped:/home/yangsz/tftpboot# chmod 777 /home/yangsz/tftpboot/

root@amped:/home/yangsz/tftpboot#

2.5. Create a tftp configuration file in the /etc/xinetd.d/ directory

(1) Enter the /etc/xinetd.d/ directory

root@amped:/home/yangsz/tftpboot#

root@amped:/home/yangsz/tftpboot# cd /etc/xinetd.d/

root@amped:/etc/xinetd.d#

(2) Create a tftp configuration file using the vi command

root@amped:/etc/xinetd.d# vi tftp

The content of the configuration file is as follows, and the "server_args = -s" parameter needs to be set to the "/home/yangsz/tftpboot/" directory we created above. Note that the "/home/yangsz/tftpboot/" directory contains the "/" symbol at the end.

```
server tftp
{
 socket_type = dgram
 protocol = udp
 wait = yes
 user = root
 server = /usr/sbin/in.tftpd
 server_args = -s /home/yangsz/tftpboot/
 disable = no
 per_source = 11
 cps = 100 2
 flags = IPv4
}
```

Using "vi" as the text editor, enter "a" to edit mode, when the modification is complete, press "Esc" to exit, and then "Shift+zz" to save the file.

(3) Start the tftpd service

root@amped:/etc/xinetd.d# sudo service tftpd-hpa start

2.6. Configure /etc/default/tftpd-hpa configuration file

(1) Configure tftpd-hpa configuration file using the vi command

root@amped:/etc/xinetd.d# vi /etc/default/tftpd-hpa

The content of the configuration file is as follows, and the "TFTP_DIRECTORY=" parameter needs to be set to the "/home/yangsz/tftpboot" directory we created above.Note that the "/home/yangsz/tftpboot" directory CANNOT contain the "/" symbol at the end.

```
# /etc/default/tftpd-hpa

TFTP_USERNAME="tftp"
TFTP_DIRECTORY="/home/yangsz/tftpboot"
TFTP_ADDRESS=":69"
TFTP_OPTIONS="-l -c -s"
```

Using "vi" as the text editor, enter "a" to edit mode, when the modification is complete, press "Esc" to exit, and then "Shift+zz" to save the file.

(2) Restart the tftpd service

root@amped:/etc/xinetd.d# sudo service tftpd-hpa restart

(3) View the running status of tftpd service

View the running status of tftpd service using the command "netstat -ntulp". When the "in.tftpd" process is running, it indicates that the tftpd service is running normally.

root@amped:/home/yangsz# netstat -ntulp

Active Internet connections (only servers)

Proto	Recv-Q	Send-Q	Local Address	Foreign Address	State	PID/Program name
tcp	0	0	127.0.0.1:6010	0.0.0.0:*	LISTEN	3757/8
tcp	0	0	127.0.0.1:6011	0.0.0.0:*	LISTEN	4138/9
tcp	0	0	127.0.0.1:631	0.0.0.0:*	LISTEN	3460/cupsd
tcp6	0	0	:::21	:::*	LISTEN	976/vsftpd
tcp6	0	0	:::22	:::*	LISTEN	1005/sshd
tcp6	0	0	::1:631	:::*	LISTEN	3460/cupsd
udp	0	0	0.0.0.0:69	0.0.0.0:*		6796/in.tftpd
udp6	0	0	:::69	:::*		6796/in.tftpd

root@amped:/home/yangsz#

3. Update firmware

First confirm that the computer serving tftpd can ping the STA/GATE that requires firmware updates. Place the firmware file and corresponding script file that need to be updated in the /home/yangsz/tftpboot directory, and then execute the corresponding firmware file update script. Updating different firmware file requires corresponding script file.

For example, updating the driver acc1340_drv.ko for ACC1340 requires the accupdate.sh script.

(1)   Place the firmware file "acc1340_drv.ko**" and corresponding script file "**accupdate.sh**" in the /home/yangsz/tftpboot directory**

(2)   Modify script file to executable properties

root@amped:/home/yangsz/tftpboot# chmod +x accupdate.sh

(3)   Run the script to update the firmware file

The IP addresses after the script file represent the source address (the IP address of the current tftpd service's computer) and the target address (STA/GATE that requires firmware update) respectively.

root@amped:/home/yangsz/tftpboot# ./accupdate.sh 192.168.1.76 192.168.1.252

echo ftpserver ip: 192.168.1.76
echo update station ip: 192.168.1.252
spawn telnet 192.168.1.252
Trying 192.168.1.252...
Connected to 192.168.1.252.
Escape character is '^]'.

Ingenic-g1_1 login: root
Password:
[root@Ingenic-g1_1:~]# cd /system/lib/modules/
[root@Ingenic-g1_1:modules]# tftp -g -l acc1340_drv_new.ko -r acc1340_drv.ko 192.168.1.76
*acc1340_drv.ko 100% |***| 314k 0:00:00 ETA*
mv acc1340_drv_new.ko acc1340_drv.ko

```
reboot
acc1340_drv.ko       100% |*******************************************************************************|   314k  0:00:00 ETA
[root@Ingenic-g1_1:modules]# mv acc1340_drv_new.ko acc1340_drv.ko
[root@Ingenic-g1_1:modules]# reboot
[root@Ingenic-g1_1:modules]# Connection closed by foreign host.
```