How to set system time and NTP server in LinPAC?

Applies to:			No. L1-002
Platform	Software operating system	OS version	Classification
LP-8x4x	Debian	All version	Product Functionality
LP-2000/5000 series LP-8x2x LX-8000/9000 series	Ubuntu		

A Linux system has two clocks: "**hardware clock**" and "**system clock**". The former is a battery driven clock which keeps track of time even when the rest of the system is powered off, and the latter one (also known as the "software clock") is a simple count of the number of ticks that have transpired since 1970/01/01 00:00 UTC. Since the system clock only exists when the system is running, it must be initialized from the hardware clock at boot time.

This guide describes how to configure the system time and Network Time Protocol (NTP) on the LinPAC.

I. Adjust time manually

The following commands show the system time and hardware time, as illustrated in Figure 1.

Command: # date // show the system clock time

Command: # hwclock // show the hardware clock time

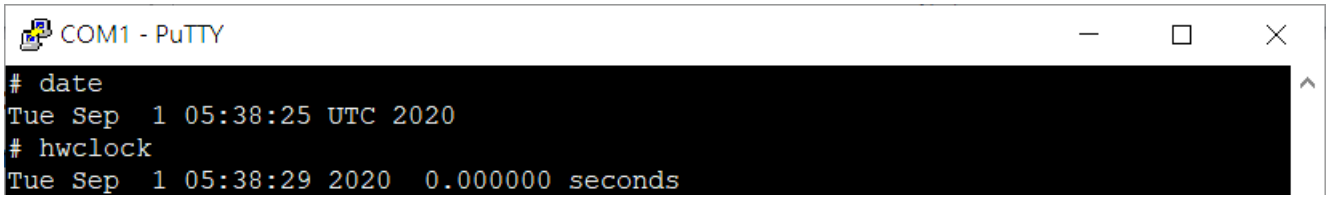

Figure 1

Note: When you find hardware clock always shows “1970/01/01 00:00” after booting the LinPAC, please check if the battery on the CPU board is dead.

User can follow the instructions below to adjust time on LinPAC:

Step 1: Set time described by string, as illustrated in Figure 2.

Command: # date [MMDDhhmm[[CC]YY][.ss]]

Step 2: Set hardware clock to system time.

Command: # hwclock -w

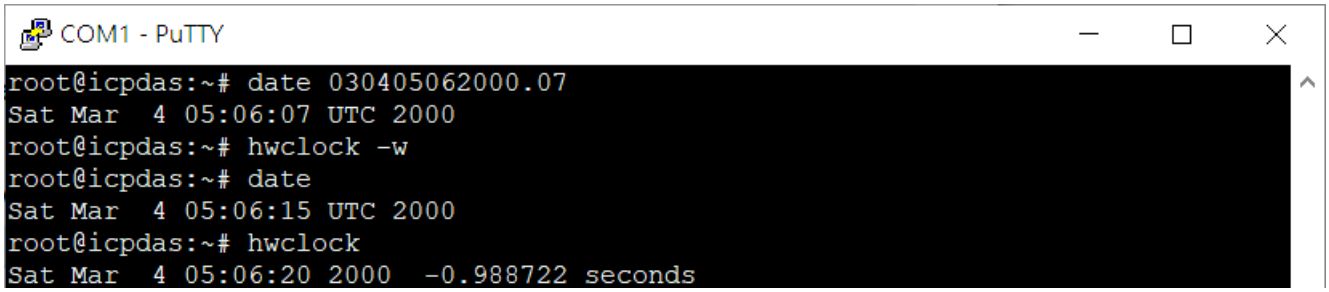

Figure 2

Note: For LinPAC using Ubuntu operation system, if user wants to set LinPAC with a special time, the “ntpd” service should be stopped, or the time will be changed to current time forcibly. Please refer to page 8 **<*Disable the ntpd service*>** for more information.

II. Time zone setting

❑ Debian operating system - LP-8x4x for example

Export environmental variable "**TZ**" to change the time zone of LinPAC (default is in UTC), user can add this command into */etc/profile* so that it can be executed automatically at boot time.

Command: # export TZ=<*std*><*offset*>[<*dst*>[*offset*],*start*[/*time*],*end*[/*time*]]

Step 1: Use the "**vi**" command to edit */etc/profile* file.

Command: # vi /etc/profile

Step 2: Add the following command into the file, we take Asia/Taipei as an example, then type ":wq" to save and quit, as illustrated in Figure 3.

Command: # export TZ=CST-8 // The time zone of Taipei is CST, which equals to UTC+8

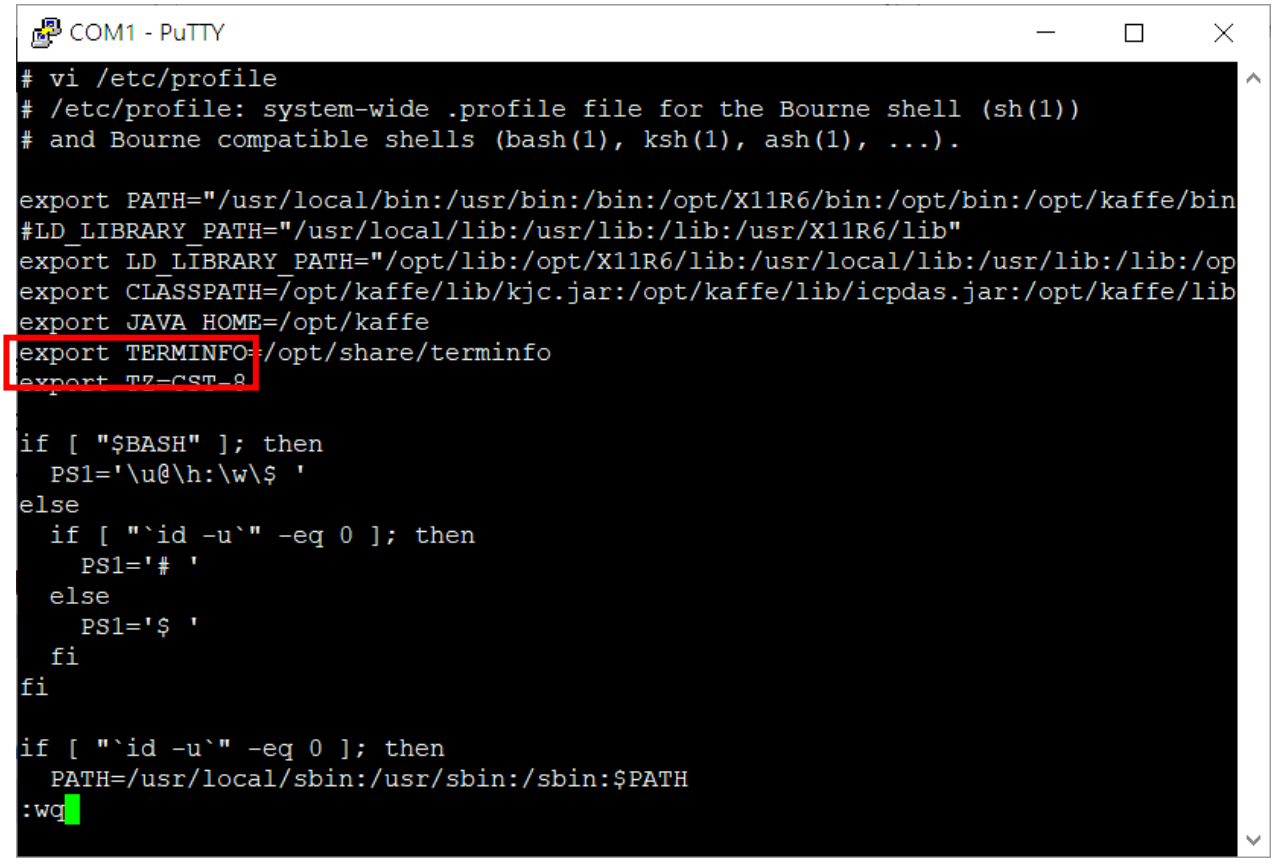

Figure 3

Step 3: After rebooting the LP-8x4x, use "date" command to check if the time zone setting is successful, as illustrated in Figure 4.

Figure 4

The following table lists some examples of TZ value which might be useful, for the complete syntax of TZ variable, please refer to:
https://www.gnu.org/software/libc/manual/html_node/TZ-Variable.html

Time zone Name	Other Common Time zone Name	Deviation from UTC	TZ
America/Anchorage	Alaska Time	UTC-9	AKST9AKDT,M3.2.0,M11.1.0
America/Los_Angeles	Pacific Time	UTC-8	PST8PDT,M3.2.0,M11.1.0
America/Denver	Mountain Time	UTC-7	MST7MDT,M3.2.0,M11.1.0
America/Chicago	Central Time	UTC-6	CST6CDT,M3.2.0,M11.1.0
America/New_York	Eastern Time	UTC-5	EST5EDT,M3.2.0,M11.1.0
Europe/London	Western European Time	UTC	GMT0BST,M3.5.0/1,M10.5.0
Europe/Berlin	Central European Time	UTC+1	CET-1CEST,M3.5.0,M10.5.0/3
Europe/Istanbul	Eastern European Time	UTC+2	EET-2EEST,M3.5.0/3,M10.5.0/4
Africa/Johannesburg	South African Standard Time	UTC+2	SAST-2
Europe/Moscow	Further-eastern European Time	UTC+3	MSK-3
Asia/Kolkata		UTC+5:30	IST-5:30
Asia/Bangkok		UTC+7	ICT-7
Asia/Beijing		UTC+8	CST-8
Asia/Hong_Kong		UTC+8	HKT-8
Asia/Singapore		UTC+8	SGT-8
Asia/Taipei		UTC+8	CST-8
Australia/Perth	Australian Western Time	UTC+8	AWST-8
Asia/Tokyo		UTC+9	JST-9
Australia/Sydney	Australian Eastern Time	UTC+10	AEST-10AEDT,M10.1.0,M4.1.0/3

Note: There should not have any space after “TZ” or it will show error message like “export: : bad variable name”.

❑ **Ubuntu operating system - LP-8x2x for example**

User can find time zone information under ***/usr/share/zoneinfo/***, current default time zone is recorded in the file ***/etc/timezone***.

To change local time zone, please use the following command:

Command: # dpkg-reconfigure tzdata

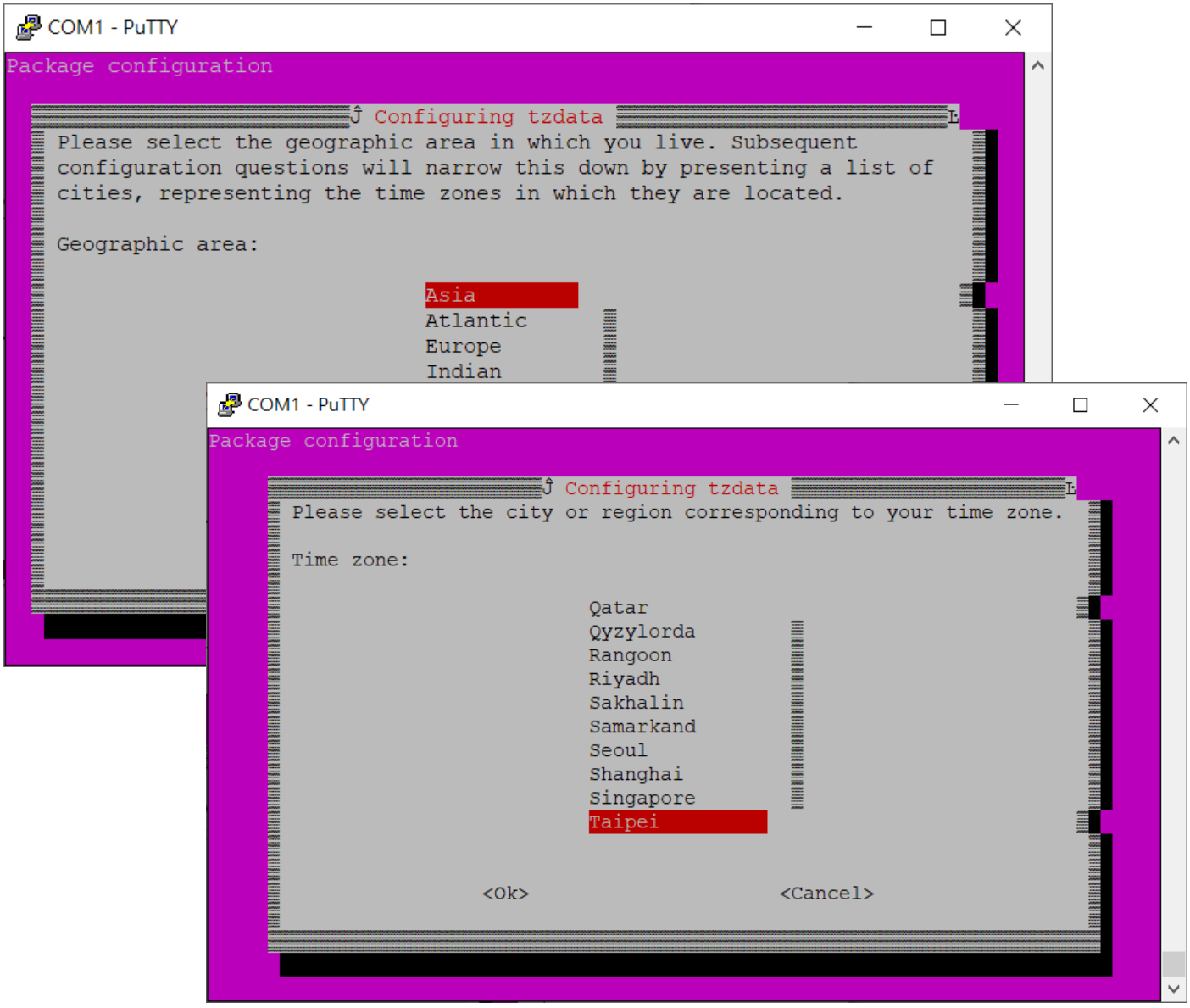

Figure 5 and 6

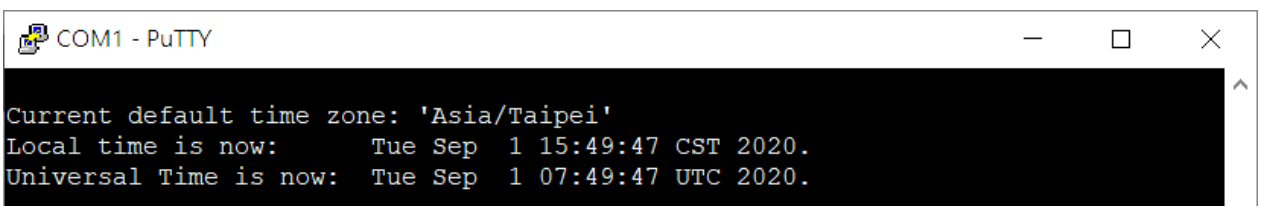

Figure 7

III. Network Time Protocol (NTP)

The Network Time Protocol (NTP) is used to synchronize the time of a computer to a reference time source. It has been in operation since 1985, and become one of the oldest Internet protocols in current use.

❑ Debian operating system - LP-8x4x for example

Step 1: Use the following command to adjust time from a network time server, as illustrated in Figure 8.
Command: # ntpdate <ntp server IP/hostname>

User can use the server provided by NTP Pool Project (http://www.pool.ntp.org/) or search "ntp server" to find a public sever near.

Step 2: Set hardware clock to system time.
Command: # hwclock -w

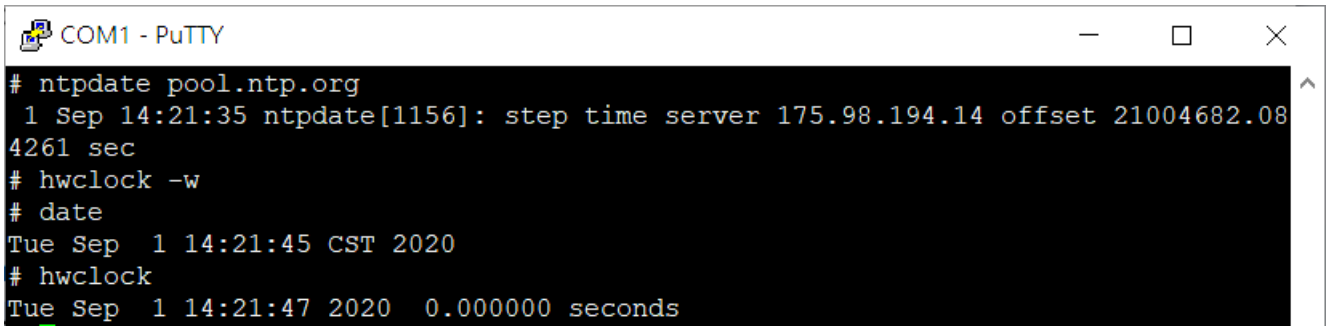

Figure 8

Automatic synchronize time at boot time

User can create the shell script below and save it in the */etc/init.d/* directory, then run the following commands to set automatic time synchronization at boot time.

Step 1: Use the following command to create a script with the filename "time_sync".
Command: # vi /etc/init.d/time_sync

Step 2: Edit the script then type ":wq" to save the script and quit, as illustrated in Figure 9.

Figure 9

Step 3: Make the script executable, use the following command to change the access permissions for the file.

Command: # chmod 755 /etc/init.d/time_sync

Step 4: Use following command to create a symbolic link to the script file so that it will be automatically executed at boot time, as illustrated in Figure 10.

Command: # ln -s /etc/init.d/time_sync /etc/rc2.d/S95time_sync

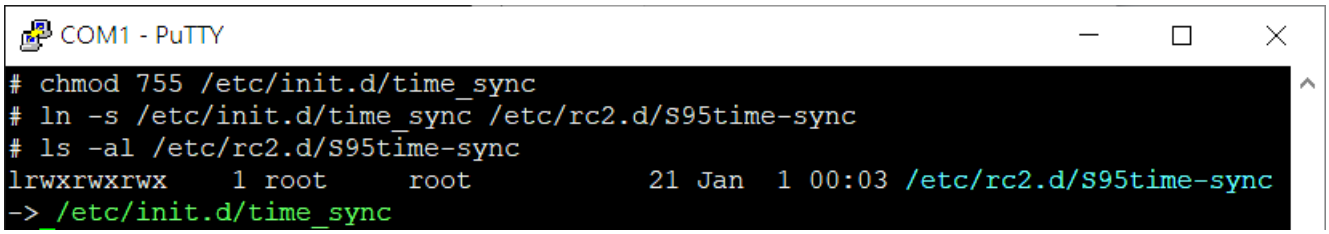

Figure 10

Step 5: After rebooting the LP-8x4x, use “date” command to check.

❑ **Ubuntu operating system - LP-8x2x for example**

LP-8x2x includes the "**ntpd**" service which provides automatic time synchronization from the network time server.

User can check ntpd status by using the following command:

Command: # service ntp status

To start/stop the service, please use the following command:

Command: # service ntp [start/stop]

To check the detail about "ntpd", please use the following command, as illustrated in Figure 11.

Command: # ntpq –p

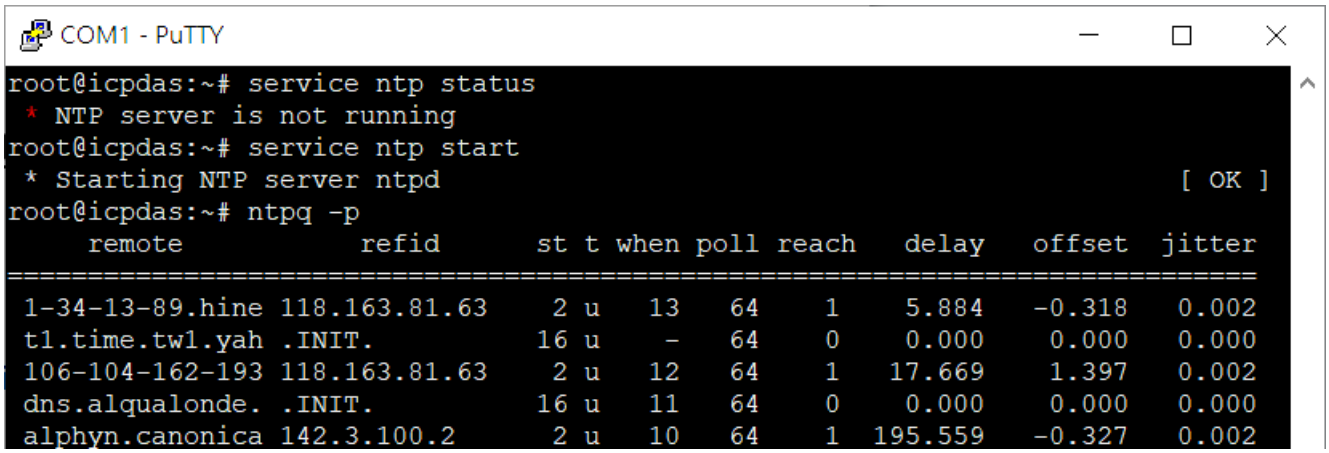

Figure 11

Disable the ntpd service

If user use the "date" command to set the system time, or need to use the "ntpdate" command for immediately time synchronization, please disable the "ntpd" service from automatically starting:

Step 1: To move the "ntpdate" file into "/etc/network" directory, use the following command:

Command: # mv /etc/network/if-up.d/ntpdate /etc/network/ntpdate

Step 2: Use the following command to remove the init script links, as illustrated in Figure 12.

Command: # update-rc.d –f ntp remove

Step 3: Reboot the LinPAC.

Step 4: Check ntpd status by using the following command:

Command: # service ntp status

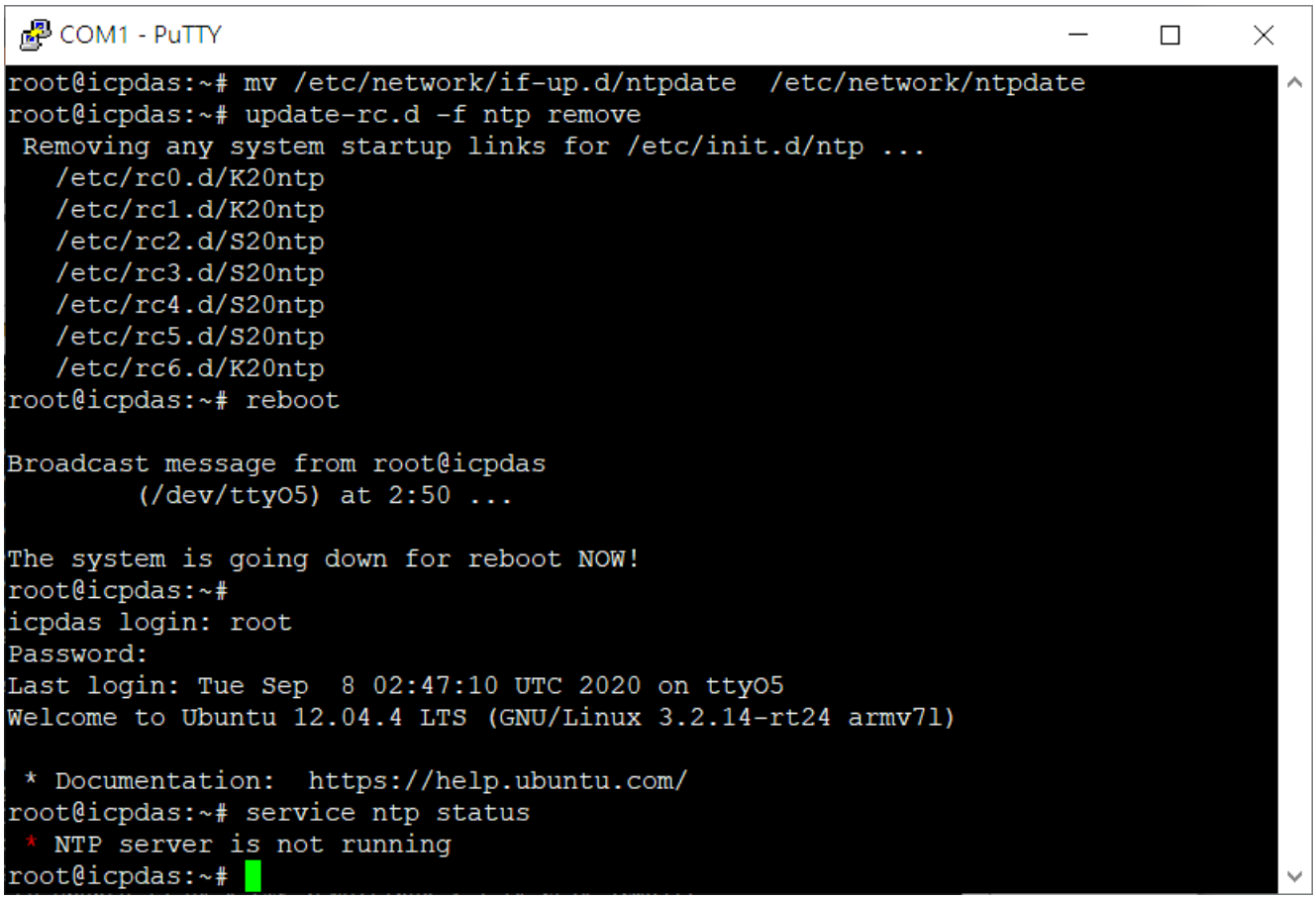

Figure 12