

Summer School in Katmandu

Curriculum of the Information Technology Class

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Lesson 1

1 Introduction

1-1 Operating System

Operating system (OS) is the software which manages the feature of the computer system and is called basic software, too. The OS manages input/output feature such as the entry from the key board and the output to the screen, and a disk and a memory and so on. It provides the basic feature which is common to a lot of application softwares.

Also, because the OS absorbs the difference of the hardware, basically, the software which was developed for some OS can be used for any computer that the OS works. The developer of the software can save time which develops software by using the feature which the OS provides and can unify the operability of the application software.

The general user in the company and the home is using the Windows series of the Microsoft Inc. as the most popular OS. There is excellent reputation in Mac OS of the Apple Inc. in the DTP and the industry of multi- media relation. In the network server of the company, the OS of the UNIX type is often used. There are UNIX of commercial, and free Linux and FreeBSD and so on.

In summer school this time, we confiscate Linux from the inside of the free OS for the server which was so and decide to learn it.

1-2 Open Source Software

The Linux is open source software at the same time as free.

The source code is the plan of the software and is the one that operation was described

in detail. It makes public a source code in the free in the Internet and so on and anyone improves it and is made to be able to do redistribution. The software is called open source software.

Generally, the source code of the program which the company and so on developed isn't made public. If there is a source code, the other company creates a similar product and can do the diversion of the technology easily. When the other company uses it, the license fee is necessary.

The way of thinking, the open source software, to that very has the following thought. It is possible to participate in developing software by anyone freely because the developer makes public a source code and shares an useful technology with the person all over the world. In to be so, the more wonderful software is born.

1-3 Distributions

Correctly, the Linux means only the basic function of the OS which is called a kernel. To function as the OS, it is necessary to combine with the other software. Then, what was complete is called a distribution. You may think that the distribution means the form when Linux is distributed.

We use a distribution, Fedora Core. This distribution was called Red Hat Linux before. Because the main constituent to develop changed, the name, too, changed at the same time.

2 Install Linux

It is necessary that the computer stands up from the CD media. It is possible to set in pushing f2 key after turning on the power of the computer.

2-1 At the first time

It pushes an Enter key with the first screen and it starts a computer from the CD media. Anaconda is an installation system of Fedora Core.

2-2 Welcome to Fedora Core

Because an explanation has been written about how to use of the mouse and the way of pushing a key, before beginning installation, it is necessary to read well beforehand.

<Press the Next button.>

2-3 What Language?

What language would you like to use during the installation process, English or Japanese?

<Press the Next button.>

2-4 Selection of the keyboard system

Select the appropriate keyboard for the system, U.S.English or Japanese?

<Press the Next button.>

The installation of the Fedora Core begins from here.

2-5 Installation Type

You can choose the type of the installation. If you choose *custom*, you can minutely decide the contents to install. In this scene, it chooses only a necessary program when futures of you learn and it decides to install it in the system.

<Press the Next button.>

2-6 Automatic Partitioning

Partitioning of the hard disk is very important work to master a system. However, because the recently large-volume hard disk became able to be used, to be so anxious passed away. In this scene, let's entrust an installer with all.

<Press the Next button.>

More continuously, the installer does a warning but there is not anxiety.

<Press the Yes button.>

2-7 Disk Setup

When installing, the setting to the hard disk ended.

<Press the Next button.>

You do a configuration to the system from this process.

2-8 Network Configurations

Edit Network Device eth0.

It removes a check in the one of the item, "Configure using DHCP", and put a check in "Active on boot". Let's set the IP Address and Netmask given from the network administrator.

Moreover, you do the other necessary setting such as the Default Gateway and DNS.

<Press the Next button.>

2-9 Firewall Configurations

You can set to improve security. However, in this scene, to make the status of the learning simple, you don't set.

<Press the Next button.>

2-10 Additional Language Support

It specifies the language to use when you use a computer system. It will use English in addition to you. Also, let's specify Japanese, too, beforehand for the time to learn Japanese.

<Press the Next button.>

2-11 Time Zone Selection

You specify a time zone.

Almost, let's click the place which is the nearest the place where you live in on the map with the mouse. Does Katmandu find where it is? Was Katmandu displayed in the list box? Asia/Katmandu can be directly chosen from the list box, too.

<Press the Next button.>

2-12 Set Root Password

root is the user who manages this computer system. Whether or not the user is root really is confirmed in entering a password according to the request. The password must be character at least 6 equal to or more than.

A password not is easily guessed by a stranger and think of the one which it doesn't forget.

<Press the Next button.>

At this time, the installer reads information on the package.

2-13 Package Group Selection

The installation takes time. In this scene, it chooses and it installs the necessary and minimum package. Choose the following package.

- X Window System
- GNOME Desktop Environment
- Graphical Internet

There are some necessary packages in this summer school at the thing except these, too. You add when they become need and install.

<Press the Next button.>

2-14 The Installation Starts

About to Install <Press the Next button.>

Required Install Media <Press the Continue button.>

The installation starts.

It depends on the ability of the computer but the time of about 50 minutes is necessary.

On the way of the work, the installer requires the exchange of the CD-ROM. Because the CD-ROM from No.1 to No.3 is necessary, it prepares beforehand.

Using the time of this installation, we let's learn the Internet.

3 Mechanisms in the Internet

3-1 Communication Protocols and Services

When the computer communicates through the network, the decided promise must be mutually kept. It is called a communications protocol.

The Internet uses a communications protocol, TCP/IP, basically but uses a wide range of protocols for the others, too. To understand their relation, you should learn the OSI Reference Model of the international standard specifications which exist as the protocol hierarchy making model.

The Internet does a communication using such a communications protocol and does a wide range of service. The whole service of the e-mail and the File Transfer and so on is the Internet.

3-2 DNS (Domain Name System)

The identification number, the IP address, must be assigned to all of the computers which participate in the Internet. At present, we arrange four figures of the decimal number from 0 to 255 and are expressing an IP address. Because there must not be an overlap in the IP address, every country is doing an allocation and management.

However, it is difficult for the human being to learn the IP address which was shown by the figure. The human being calls the name which put a computer a host name. Then, we say a domain name along with the name of the host name and the network.

The system which mutually changes the IP address which is easy to understand for the computer and the domain name which is easy to understand for the human being is DNS (Domain Name System).

3-3 WWW (World Wide Web)

Positional-informations such as the other document and the image which was embedded in the document are called a hyperlink. The system which related more than one document and the object of the related image and so on using the hyperlink is called a hypertext.

The WWW (World Wide Web) was born in European nuclear physics institute (CERN) in 1989. The WWW can be called the representative example of the hypertext. The WWW server is the system which provides a document (hyper text) on the Internet. On the other hand, the WWW client is the software (browser) that the user browses a document.

We describe a document using the language which is called HTML (Hyper Text Markup Language). We describe the place (URL: Uniform Resource Locater) where a linked document is saved and link some HTML document and the other HTML document. It displays a browser based on the tag which was described in the HTML document. The WWW document provides all daters such as the still image and the sound, the video in addition to the character.

4 Initial setting and Operations check

If displayed with “Congratulations, the installation is complete.” it removes the CD-

ROM to have used for the installation from the tray, and you push the "reboot" button and you make a computer system restart.

For the computer to start up, the time of 3 or about 4 minutes is necessary. At this time, the button which is called "Show Detail" is displayed in the screen. Attempt to click.

We can see that very a lot of programs (processes) start up for the Linux to work.

4-1 Welcome

<Press the Next button.>

4-2 License Agreement

Check the following comment. "Yes, I agree to the License Agreement"

<Press the Next button.>

4-3 Date and Time

Confirm whether the date and the time are correct. If necessary, it sets respectively. We don't set to the protocol therefore now.

<Press the Next button.>

4-4 Display

You press "Configure" button, and you should set the type of the display to the "LCD Panel 1024*768". Adjust a resolution to that. Also, the million will be good for the number of the colors.

<Press the Next button.>

4-5 System User

You subscribe a general user to the computer system. At the time as you manage a computer system, the authority of root is necessary but as for being general, you operate a computer system as the general user.

<Press the Next button.>

4-6 Sound Card

If your computer system is equipped with the sound card, the operation can be tested here. Press the button of "Play test sound". Is it possible to have heard some sound?

<Press the Next button.>

4-7 Additional CDs

Here, the program of the addition can be installed. Now progresses next, not being in what.

<Press the Next button.>

4-8 Finish Setup

All of the initial settings ended. In this, the computer system can be used. We log in immediately and attempt to confirm that the computer system works.

4-9 Login, Logout and Shutdown

To ascertain whether or not the installation which we did is full, let's attempt to log in to the computer system.

You enter an account and a password as the general user and log in to the computer system. After that, you log out in choosing a menu.

Again, you log in and this time, you shut down a computer system.

It ends the work to install the Linux which we had a purpose of in.

Lesson 2

5 System Administrations

The administrator of the UNIX type systems such as the Linux is called root. Because, it is because it does a system administration using the special user ID, root. root needs the knowledge and the technology which is different from managing a PC for the individual completely.

When you log in to the Linux, you use the account of the general user. Then, when the authority of root becomes need, you acquire the authority of the system administration. In the case, you use a command, later explained su.

By the way, at first, you do the preparation which uses a command. Click the right button of the mouse and start a console.

5-1 File System

5-1-1 The hierarchical structure: Directory)

The meaning in the directory is a telephone directory and a list. It is the term which means the structure to manage by recording information to the storage of the hard disk and so on. The structure is made a hierarchy and you must operate a file while you move in it.

Command: ls, pwd, cd, mkdir, rmdir

5-1-2 Important Directory

You create a directory freely and can use it. However, it exists in the directory which the Linux system decides a way of using on. Let's attempt to see those places and the contents of the file.

Directory: /etc, /home, /var/www

Command: cat

5-1-3 Permission

You need authority to the file to read, to write and to execute a file. The authority depends on the situations such as the owner of the file, the group, and the other user which the owner belongs to. root can do the operation which transcends the authority of the user.

Command: ls -l, chmod, chown

5-2 System Administration

5-2-1 User

You are logging in as the general user and have the time to want of root to work. Also, you are logging in as root and have the time to want to work about the other user. In that case, you use command su. In to use option -, it is possible to work by the new user environment.

It is desirable to change a password regularly to improve security. Command passwd changes a password.

Root subscribes a new user to the system and deletes him. Command useradd and userdel does it.

If necessary, root makes a system quit using command shutdown.

Command: su, useradd, userdel, passwd, shutdown

5-2-2 Network

These are the command to use when setting the environment of the network and a fault is caused in the network. These commands have a lot of options and you can do eclectic how to use.

Command: ping, ipconfig, tracerute, nslookup (dig), netstat, route

5-2-3 LOG file.

The operation of the system is recorded to the log file. Also, access from outside to the server, too, is recorded to the log file. There are records of the transmitting and receiving of the e-mail and so on in the others, too.

Directory: /var/log,

Command: head, tail

5-2-4 Install the package software

There are some ways of operating a software package. The main way is a `r/min` and `yum`. You can install the latest package using the network.

Command `system-config-packages` easily operates the package which was included in the CD-ROM by graphical.

Command: `rpm, yum, system-config-packages`

5-3 Process Management

The process about the UNIX is the unit that the OS manages a program and a command. As for being general, the system manages a process automatically. You use the following command to manage a process consciously.

You can watch over the process which is working at present and end the process which doesn't have need.

Command: `ps, (grep), kill, top`

5-4 Network Utilities

Through the network, you can operate a computer, being remote. By it, it seems that the immediateness has the computer which is far. Using command `telnet`, you put on by the communication with the program of the server, too.

Also, the computer which is far and your computer can exchange a file. You can download a free software from the Internet using the command `ftp` and upload a HTML document in the WWW server.

Command: `telnet, ftp`

5-5 Ask the Internet to the Internet. (Learn by yourself)

It says that you should ask the Internet to the Internet. It is limited in the time, too.

In the following command, therefore, learn anyhow by yourself.

5-5-1 Wild Card

5-5-2 Regular Expression

5-5-3 Redirection and Pipe

5-5-4 Job

Command: `command &, process ID, Ctrl+C, Ctrl+Z, jobs, bg, fg, kill`

Lesson 3

6 Install WWW (Web Server)

When we refer to the Web page in the Web browser, the WWW server is providing the feature. The WWW server software which is most often used in the world at present is Apache HTTP Server. Apache isn't installed in the system which we are using now as shown in the following command. The name of the package of Apache is httpd.

```
# rpm -q httpd
```

(If you don't have the authority of root, become root using the "su -"command.)

Since then, we begin at the installation of Apache.

6-1 Install Apache Web Server

You insert the Fedora Core 3 system CD-ROM #1 in the drive. Then, by the following command, you become able to handle a CD-ROM.

```
# mount /media/cdrom
```

(The CD-ROM may possibly be automatically mounted already.)

You execute the executive program which had a purpose of installing the package which is preserved in the CD-ROM.

```
# system-config-packages
```

You check Web Server and press the Update button. The dialog box for the confirmation opens, and you press the Continue button.

It takes (probably, are equal to or more than 5 minutes) time for a while.

If the display of Update Complete comes out, you press the OK button.

It pushes the Quit button and you end Package Management.

By the way, will Apache have been able to be installed, being good?

```
# rpm -q httpd
```

At this point, httpd doesn't start up. Let's attempt to confirm. You use the following command or use Firefox which is a browser.

```
# ps ax | grep httpd
httpd://localhost/ or httpd://127.0.0.1/ (URL in Firefox)
```

You use the following command to make http start up.

```
# /etc/init.d/httpd start
```

This command can stop and restart httpd, too.

The warning about the name of the server comes out but http seems started.

As previous, let's attempt to confirm that httpd works.

In the present setting, when the system starts up, httpd doesn't start up.

```
# chkconfig --list httpd
```

Therefore, it sets for httpd to start up at the same time when the system starts up.

```
# chkconfig --level 35 httpd on
```

6-2 How to use vi Text Editor

To understand because the warning about the name of the server came out, we must set the operation of httpd. For its purpose, we must rewrite a configuration file using the editor. You learn how to use of vi which is the editor program.

You start up editor program vi using the following command. The file name is "test".

```
# vi test
```

Operation Mode:

Editor vi has a COMMAND mode and INPUT mode. Immediately after start-up, vi is a COMMAND mode.

To switch over from the COMMAND mode to INPUT mode, you enter character "i" (or "a" or "A"). The character "i" means Insert, and "a", "A" means Append.

To return to the COMMAND mode from INPUT mode, you press ESC key.

Move Cursor (COMMAND mode / INPUT mode):

```
h      move a cursor to the left.
l      move a cursor to the right.
k      move a cursor up.
j      move a cursor down.
```

Above-mentioned key operation is valid at the time of the COMMAND mode. You can

use it for the COMMAND mode and INPUT mode by being able to use a cursor (the arrow) key, too.

File Handling (COMMAND mode):

```
:w      save the file to be editing (write)
:q      end if there is not a change-point which doesn't save (quit)
:q!     end compulsorily without saving
:wq     save and end
```

Deletion of the Straight Line or a Character (INPUT mode):

```
x      delete the character of the position where there is a cursor
dd     delete the straight line where there is a cursor
```

The other convenient feature (COMMAND mode):

```
:set number      display line number
:/keyword        search the keyword
```

6-3 Set the configuration file

The “httpd.conf” which is the configuration file of Apache is in / etc/httpd/conf. You move to the place.

```
# cd /etc/httpd/conf
```

You open a configuration file by vi.

```
# vi httpd.conf
```

You search for the section of the setting about the 'Main' server using the j and k key or the Cursor key. The title of the setting is probably written in the 203rd line.

```
### Section 2: 'Main' server configuration
```

When there is mark # in the beginning of the party, it shows a notation sentence.

You must make alterations at the following part.

```
#ServerName new.host.name;80
```

```
---> ServerName myhost.mydomain:80
```

However, this setting is not specifically essential one regrettably in the practice this time.

Moreover, you confirm the following setting. It specifies the place which saves the

HTML document which the server makes public. That is, you should preserve the HTML document to want to make public in this directory.

```
DocumentRoot "/var/www/html"
```

Then, you save this configuration file and end vi editor.

```
ESC
```

```
:wq
```

You must make httpd restart.

```
# /etc/init.d/httpd restart
```

This time, the warning about the name of the server doesn't come out. Will you have had a feeling to that?

6-4 Check the action of Web Server

You move to the directory / var/www/html.

```
# cd /var/www/html
```

Therefore, you create the file of the name, test.html which is shown next using editor vi. This is the simplest model of the HTML document.

Y If saving a complete HTML document, you attempt to refer to this by Firefox browser.

```
/var/www/html/test.html
```

```
<html>
```

```
<head>
```

```
<title>Test Page of WWW System</title>
```

```
</head>
```

```
<body>
```

```
<h1>Test of WWW</h1>
```

```
This is the a page of WWW System.
```

```
</body>
```

```
</html>
```