
Linux系统基础

第一天

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2024年

准备工作

本课程QQ群号 740794181

进群请修改群昵称为：学号 姓名

Linux操作系统溯源

□ Unix操作系统

- 1969年诞生，由 AT&T 贝尔实验室的 Ken Thompson 和 Dennis Ritchie 等人开发

□ Minix操作系统

- 1980年代，由 Andrew S. Tanenbaum 开发，用于教学

□ linux操作系统

- 1991年，Linus Torvalds 开发

comp.os.minix新闻组中发布的Linux第一个公告

Path: gmdzi!unido!fauern!ira.uka.de!sol.ctr.columbia.edu!zaphod.mps.ohio-state.edu!wupost!uunet!mcsun!news.funet.fi!hydra!klaava!torvalds
From: torv...@klaava.Helsinki.FI (Linus Benedict Torvalds)
Newsgroups: comp.os.minix
Subject: What would you like to see most in minix?
Summary: small poll for my new operating system
Keywords: 386, preferences
Message-ID: <1991Aug25.205708.9541@klaava.Helsinki.FI>
Date: 25 Aug 91 20:57:08 GMT
Organization: University of Helsinki
Lines: 20

Hello everybody out there using minix -

I'm doing a (free) operating system (just a hobby, won't be big and professional like gnu) for 386(486) AT clones. This has been brewing since april, and is starting to get ready. I'd like any feedback on things people like/dislike in minix, as my OS resembles it somewhat (same physical layout of the file-system (due to practical reasons) among other things).

I've currently ported bash(1.08) and gcc(1.40), and things seem to work. This implies that I'll get something practical within a few months, and I'd like to know what features most people would want. Any suggestions are welcome, but I won't promise I'll implement them :-)

Linus (torv...@kruuna.helsinki.fi)

PS. Yes - it's free of any minix code, and it has a multi-threaded fs. It is NOT portable (uses 386 task switching etc), and it probably never will support anything other than AT-harddisks, as that's all I have :-).

Linux vs Linux发行版

□ Linux

- 操作系统的内核，管理硬件资源、提供基本服务

□ linux发行版

- 将Linux内核与应用程序、库文件、用户界面等打包在一起，形成一个完整可用的操作系统
-

Linux发行版排名

GNU/Linux Distributions Listed by Google Trends Scores

Ranked by average weekly scores over a one year period between January 2023 - January 2024

| Google Trends | Name | Distro Watch | Google Trends | Name | Distro Watch | Google Trends | Name | Distro Watch | Google Trends | Name | Distro Watch |
|---------------|--------------|--------------|---------------|-------------|--------------|---------------|----------------|--------------|---------------|--------------|--------------|
| 1 | Ubuntu | 6 | 21 | Parrot | 46 | 41 | KDE neon | 14 | 61 | Archman | 80 |
| 2 | Debian | 4 | 22 | Lubuntu | 43 | 42 | Slax | 79 | 62 | PureOS | 52 |
| 3 | Kali | 18 | 23 | Kubuntu | 34 | 43 | Solus | 32 | 63 | ClearOS | 67 |
| 4 | CentOS | 50 | 24 | Xubuntu | 54 | 44 | Vanilla | 23 | 64 | Endless | 76 |
| 5 | Arch | 63 | 25 | OpenSUSE | 9 | 45 | Nobara | 16 | 65 | LXLE | 91 |
| 6 | Linux Mint | 2 | 26 | MX Linux | 1 | 46 | Knoppix | 276 | 66 | Rosa | 105 |
| 7 | Fedora | 7 | 27 | Elementary | 13 | 47 | Ubuntu Studio | 92 | 67 | Ubuntu Kylin | 151 |
| 8 | RHEL | 62 | 28 | Endeavour | 3 | 48 | Bodhi | 41 | 68 | SmartOS | 37 |
| 9 | Manjaro | 5 | 29 | Deepin | 77 | 49 | Q4OS | 29 | 69 | BunsenLabs | 111 |
| 10 | RasPi OS | 122 | 30 | Linux Lite | 11 | 50 | LinuxFX | 51 | 70 | PCLinuxOS | 22 |
| 11 | Alpine | 27 | 31 | Puppy Linux | 19 | 51 | Mageia | 17 | 71 | Kodachi | 88 |
| 12 | Pop!_OS | 8 | 32 | Slackware | 42 | 52 | ArcoLinux | 25 | 72 | SparkyLinux | 20 |
| 13 | Rocky | 48 | 33 | Garuda | 12 | 53 | Artix | 78 | 73 | Archcraft | 49 |
| 14 | Oracle Linux | 87 | 34 | Qubes | 53 | 54 | Peppermint | 31 | 74 | XeroLinux | 56 |
| 15 | Tails | 38 | 35 | Void | 93 | 55 | Ubuntu Budgie | 107 | 75 | AV Linux | 103 |
| 16 | Zorin | 10 | 36 | Ubuntu MATE | 82 | 56 | Ultimate Linux | 152 | 76 | Athena | 66 |
| 17 | NixOS | 26 | 37 | ALT Linux | 64 | 57 | wattOS | 69 | 77 | SystemRescue | 132 |
| 18 | AlmaLinux | 21 | 38 | antiX | 15 | 58 | Clear Linux | 67 | 78 | Voyager | 40 |
| 19 | Gentoo | 59 | 39 | BlackArch | 162 | 59 | Devuan | 36 | 79 | Nitrux | 61 |
| 20 | SteamOS | 275 | 40 | Tiny Core | 75 | 60 | blendOS | 45 | 80 | EuroLinux | 74 |

使用Linux

- 通过虚拟化软件安装/导入Linux

 - virtualbox

 - www.virtualbox.org

 - vmware

 - www.vmware.com

- 通过微软的WSL

- 申请公有云上的Linux虚拟机

- 在mini主机、树莓派等小型主机上安装Linux系统

- Live USB

ubuntu Linux安装镜像/虚拟机镜像

□ubuntu官网

■ubuntu.com

□product->ubuntu desktop

□product->ubuntu server

□box.nju.edu.cn

■<https://box.nju.edu.cn/d/93ef004ec0a54c689c95/>

通过virtualbox安装ubuntu Linux

□ 安装ubuntu desktop

■ <https://itslinuxguide.com/install-ubuntu-virtualbox/>

□ 安装ubuntu server

■ <https://www.linuxtechi.com/how-to-install-ubuntu-server/>

通过virtualbox导入ubuntu Linux

□ 导入ubuntu linux VM image

- <https://www.arysontechnologies.com/blog/how-to-open-vdi-file/>
- 默认登录用户名/密码: ubuntu/ubuntu

□ 修改时区

- `echo "zone=Asia/Shanghai" | sudo tee -a /usr/share/zoneinfo/Asia/Shanghai`
 - `sudo rm /etc/localtime`
 - `sudo ln -s /usr/share/zoneinfo/Asia/Shanghai /etc/localtime`
-

Virtualbox中虚拟机的网络设置

□ 添加NAT网络

■ 管理->工具->网络管理器->NAT网络->创建

□ 虚拟机连接NAT网络

■ 选择虚拟机->设置->网络->网卡1->连接方式设置为NAT网络

Virtualbox中虚拟机的远程访问

□ 添加端口转发

- 管理->工具->网络管理器->NAT网络->端口转发->添加转发规则

- 将虚拟机的端口号22映射到本机回路地址的未使用端口

□ 虚拟机启用SSH服务

- `sudo apt update`
 - `sudo apt install openssh-server`
 - `sudo systemctl start ssh`
-

ubuntu Linux server登录后的界面

```
Ubuntu 24.04 LTS ubuntu2204 tty1
ubuntu2204 login: ubuntu
Password:
Welcome to Ubuntu 24.04 LTS (GNU/Linux 6.8.0-31-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/pro

System information as of Mon Jul  1 04:38:59 PM CST 2024

System load:  0.0               Processes:            127
Usage of /:   10.7% of 59.74GB  Users logged in:     1
Memory usage: 10%              IPv4 address for enp0s3: 10.0.2.31
Swap usage:   0%

 * Strictly confined Kubernetes makes edge and IoT secure. Learn how MicroK8s
   just raised the bar for easy, resilient and secure K8s cluster deployment.

   https://ubuntu.com/engage/secure-kubernetes-at-the-edge

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

*** System restart required ***
Pending kernel upgrade!
Running kernel version:
  6.8.0-31-generic
Diagnostics:
  The currently running kernel version is not the expected kernel version 6.8.0-36-generic.
ubuntu@ubuntu2204:~$
```

bash

Shell prompt

ubuntu@ubuntu2204:~\$



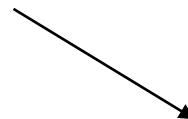
用户名



主机名



当前位置



当前身份

ubuntu@ubuntu2204:~\$ **date**

Mon Jul 1 08:42:56 PM CST 2024

ubuntu@ubuntu2204:~\$ **echo hello**

hello

环境变量\$PATH

```
ubuntu@ubuntu2204:~$ echo $PATH
```

```
/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/local/games:/snap/bin
```

```
ubuntu@ubuntu2204:~$ which echo
```

```
/usr/bin/echo
```

Linux系统中的路径

- 路径是一组使用正斜杠/分隔的目录，
 - 绝对路径
 - 以/开头的路径
 - 相对路径
 - 相对于当前工作目录的路径
 - 命令**pwd**可以获取当前工作目录
 - 切换目录
 - 命令**cd**用于切换目录
 - 在路径中，**.**表示当前目录，**..**表示上级目录
-

路径练习

```
$ pwd
```

```
$ cd /home
```

```
$ pwd
```

```
$ cd ..
```

```
$ pwd
```

```
$ cd ./home
```

```
$ pwd
```

```
$ cd ubuntu
```

```
$ pwd
```

```
$ ../../bin/echo hello
```

下面两个命令的作用是什么？

```
$ cd ~
```

```
$ cd -
```

显示目录内容

```
$ ls
```

```
$ cd /home
```

```
$ ls
```

```
$ ls ..
```

查看命令帮助

❑ man command

- man ls

❑ command -h | command --help

- ls --help

❑ tldr command

- 官方页面 <https://github.com/tldr-pages/tldr>
- 安装方法 `apt install tldr`
- 网页访问 <https://tldr.inbrowser.app>

查看文件/目录的详细信息

```
$ ls --help
```

```
-l          use a long listing format
```

```
$ ls -l /home
```

```
total 4
```

```
drwxr-x--- 4 ubuntu ubuntu 4096 Apr 30 04:03 ubuntu
```

其他常见命令

- ❑ mv
 - mv a.txt b.txt
 - mv directory-1 directory-2
 - mv a.txt /home/ubuntu
- ❑ cp
 - cp a.txt b.txt
 - cp a.txt ../
- ❑ rm
 - rm a.txt
 - rm directory-1 ?
- ❑ rmdir
 - rm directory-1
- ❑ mkdir
 - mkdir directory-1

ctrl+l（小写L）
的作用是什么
？

在程序之间建立连接

——重定向

☐ 输入流

- 默认键盘

☐ 输出流

- 默认屏幕

☐ 重定向流到文件

- **> file**

- ☐ `echo hello > hello.txt`
- ☐ `cat hello.txt`

- **< file**

- ☐ `cat < hello.txt`
- ☐ `cat < hello.txt > hello2.txt`

- **>> file**

- ☐ `cat < hello.txt >> hello2.txt`

在程序之间建立连接

——管道

- 管道“|”将一个程序的输出和另一个程序的输入连接起来
 - `ls -l / | tail -n1`

在程序之间建立连接

——管道

□ ls | rm

- 这个命令能删除当前目录下的所有文件吗？如果不行，为什么？
- 如果一定要通过管道实现这个功能，应该怎么做？

命令sudo

□ root用户

□ sudo命令

- 允许普通用户以super user的身份执行操作
- `sudo echo 1 > /sys/class/leds/input2::capslock/brightness`
 - 这个命令可以成功吗?
- `sudo -i`、`sudo su`
 - `echo 1 > /sys/class/leds/input2::capslock/brightness`
- `echo 1 | sudo tee /sys/class/leds/input2::capslock/brightness`

作业1提交方法和截止日期

- ❑ 实验报告的文件名命名统一为：学号_lab01.pdf
- ❑ 提交截止日期：2024年7月25日零点
- ❑ 实验报告通过电子邮件发送给
chenj@nju.edu.cn

软件包更新

- ☐ apt update
- ☐ apt upgrade
- ☐ apt dist-upgrade



谨慎使用

软件包管理

- ❑ 搜索软件包
 - `apt-cache -n search` 软件包名
- ❑ 安装软件包
 - `apt install` 软件包名
- ❑ 卸载软件包
 - `apt --purge remove` 软件包名
- ❑ 查看软件包是否已安装
 - `apt list --installed | grep` 软件包名
 - `dpkg -l` 软件包名
- ❑ 查看已安装软件包中包含的文件
 - `dpkg -L` 软件包名
- ❑ 查看某个命令是由哪个软件包提供
 - `dpkg -S command`