Vutek Linux Tutorial

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Service Engineering

# Linux Introduction

What is Linux?

What is Linux?

- Linux is, in simplest terms, an operating system. It is the software on a computer that enables applications and the computer operator to access the devices on the computer to perform desired functions. The operating system (OS) relays instructions from an application to, for instance, the computer's processor. The processor performs the instructed task, then sends the results back to the application via the operating system.

- Explained in these terms, Linux is very similar to other operating systems, such as Windows and OS X.

- As an open operating system, Linux is developed collaboratively, meaning no one company is solely responsible for its development or ongoing support. Companies participating in the Linux economy share research and development costs with their partners and competitors. This spreading of development burden amongst individuals and companies has resulted in a large and efficient ecosystem and unheralded software innovation.

- Linux is also unique from other operating systems in that it has no single owner.

The Kernel
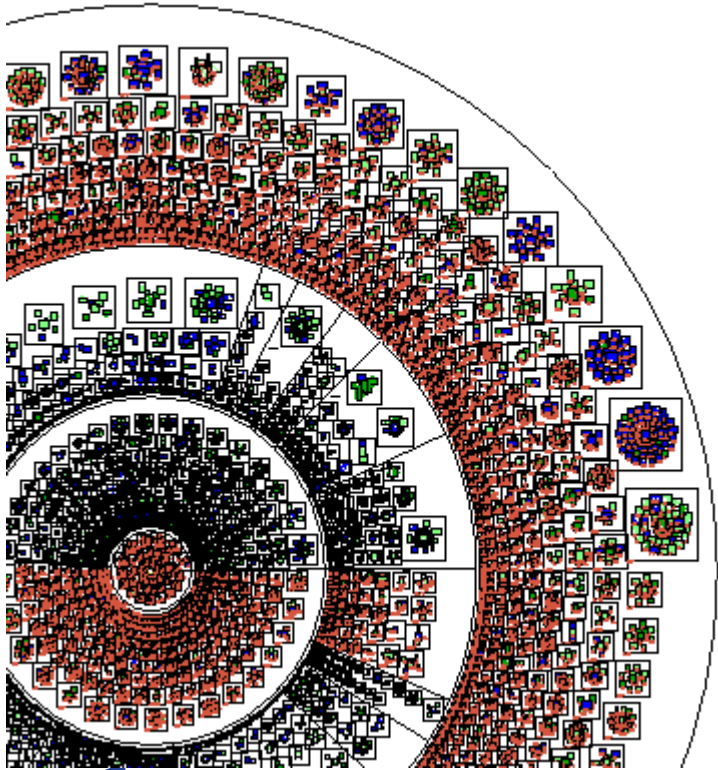
- All operating systems have kernels, built around the architectural metaphor that there must be a central set of instructions to direct device hardware, surrounded by various modular layers of functionality. The Linux kernel is unique and flexible because it is also modular in nature.

- Modularity is desirable because it allows developers to shed parts of the kernel they don't need to use. Typically a smaller kernel is a faster kernel, because it isn't running processes it does not need.

- This modularity is significant to the success of Linux. The ability to scale down (or up) to meet the needs of a specific platform is a big advantage over other operating systems constrained to just a few possible platforms.

- Modularity also effects stability and security as well. If one piece of the kernel code happens to fail, the rest of the kernel will not crash. Similarly, an illicit attack on one part of the kernel (or the rest of the operating system) might hamper that part of the code, but should not compromise the security of the whole device.

The Operating System
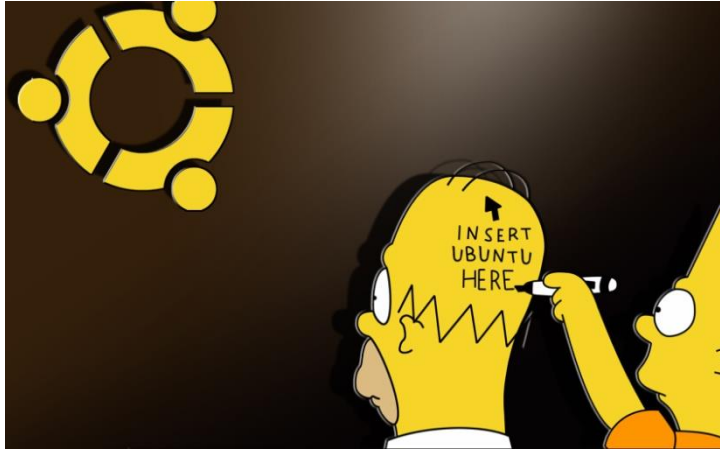
- Developers need special tools (like the compilers and command lines found in GNU) to write applications that can talk to the kernel. They also need tools and applications to make it easy for outside applications to access the kernel after the application is written and installed.
- This collective set of tools, combined with a kernel, is known as the operating system. It is generally the lowest layer of the computer's software that is accessible by the average user. General users get to the operating system when they access the command line.
- Linux provides powerful tools with which to write their applications: developer environments, editors, and compilers are designed to take a developer's code and convert it to something that can access the kernel and get tasks done.
- Like the kernel, the Linux operating system is also modular. Developers can pick and choose the operating tools to provide users and developers with a new flavor of Linux designed to meet specific tasks.

Advantages and Benefits of Linux

"it's going to put me out of business"

Download Ubuntu 7.04 Feisty Fawn from www.ubuntu.com
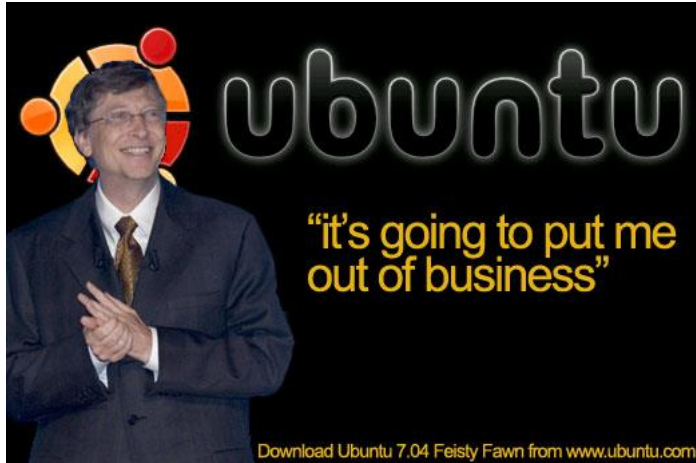
- One of the significant benefits of open source software such as Linux is that because it has no owner, it can be debugged without resource to a license owner or software proprietor. Businesses therefore have the flexibility to do as they wish with the OS without having to worry about conforming to complex license agreements.

- The major advantage of Linux is its cost: the core OS is free, while many software applications also come with a GNU General public License. It can also be used simultaneously by large numbers of users without slowing down or freezing and it is very fast. It is an excellent networking platform and performs at optimum efficiency even with little available hard disk space.

- Linux also runs on a wide range of hardware types, including PCs, Macs, mainframes, supercomputers, and Vutek printers.

Linux Command Shell

Terminal Window Basic Line Commands

What is a command shell?
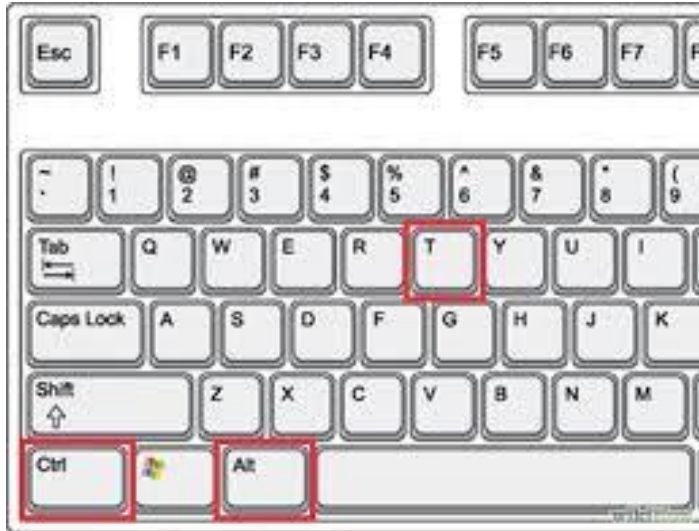
- A program that interprets commands

- Allows a user to execute commands by typing them manually at a terminal, or automatically in programs called shell scripts.

- A shell is not an operating system. It is a way to interface with the operating system and run commands.

- Press **Ctrl+Alt+T** to open a shell / terminal.
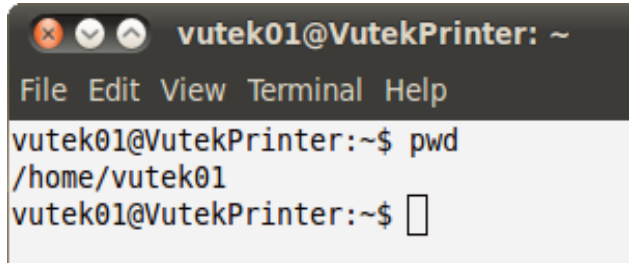
How is Linux Shell different from the DOS command prompt?

- **Case Sensitivity** In Linux, commands and filenames are case sensitive, meaning that typing "EXIT" instead of the proper "exit" is a mistake.

- **"\" vs. "/"** In DOS, the forward-slash "/" is the command argument delimiter, while the backslash "\" is a directory separator. In Linux/UNIX, the "/" is the directory separator, and the "\" is an escape character.

- **Filenames**: The DOS world uses the "eight dot three" filename convention, meaning that all files followed a format that allowed up to 8 characters in the filename, followed by a period ("dot"), followed by an option extension, up to 3 characters long (e.g. FILENAME.TXT). In Linux, there is no such thing as a file extension. Periods can be placed at any part of the filename, and "extensions" may be interpreted differently by all programs, or not at all.

Special Characters

Character	Description
\	Escape character. If you want to reference a special character, you must "escape" it with a backslash first. **Example**: `touch /tmp/filename\*`
/	Directory separator, used to separate a string of directory names. **Example**: `/usr/src/linux`
.	Current directory. Can also "hide" files when it is the first character in a filename.
..	Parent directory
*	Represents 0 or more characters in a filename, or by itself, all files in a directory. **Example**: `pic*2002` can represent the files `pic2002, picJanuary2002, picFeb292002,` etc.
?	Represents a single character in a filename. **Example**: `hello?.txt` can represent `hello1.txt, helloz.txt`, but not `hello22.txt`
[]	Can be used to represent a range of values, e.g. [0-9], [A-Z], etc. **Example**: `hello[0-2].txt` represents the names `hello0.txt, hello1.txt`, and `hello2.txt`

Character	Description
		"Pipe". Redirect the output of one command into another command. **Example**: `ls	more`
>	Redirect output of a command into a new file. If the file already exists, over-write it. **Example**: `ls > myfiles.txt`
>>	Redirect the output of a command onto the end of an existing file. **Example**: `echo "Mary 555-1234" >> phonenumbers.txt`
<	Redirect a file as input to a program. **Example**: `more < phonenumbers.txt`
;	Command separator. Allows you to execute multiple commands on a single line. **Example**: `cd /var/log ; less messages`
&&	Command separator as above, but only runs the second command if the first one finished without errors. **Example**: `cd /var/logs && less messages`
&	Execute a command in the background, and immediately get your shell back. **Example**: `find / -name core > /tmp/corefiles.txt &`

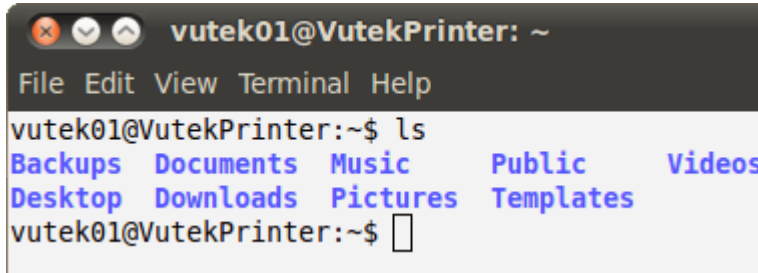# Display current working directory


```
vutek01@VutekPrinter: ~
File  Edit  View  Terminal  Help
vutek01@VutekPrinter:~$ pwd
/home/vutek01
vutek01@VutekPrinter:~$ 
```

- **pwd** (print working directory)
  - Displays your current directory
- To find out what is your current working directory, type
  - **pwd**

Listing files and directories

- **ls** (list)
  - Displays contents of directory
- To find out what is in your current working directory, type
  ls

Listing hidden files and directories

- **`ls -a`** (list)
  - Displays hidden contents of directory
  - Files or directories beginning with (.) dot are hidden
- To find out what is in your current working directory, type
  `ls -a`

Listing files and directories

- **`ls -l`** (long list)
- **`ls -lh`** (long list human readable)
  - Displays contents of directory
  - Long list showing file owner, permissions and size
- To find out what is in your current working directory, type

  `ls   -l`
  `ls   -lh`

Making Directories

* **`mkdir` (make directory)**
  – Creates new directory
* To create a new directory, type
  `mkdir` *'new directory name'*

* To see the directory you have just created, type
  `ls`

Changing to a different directory
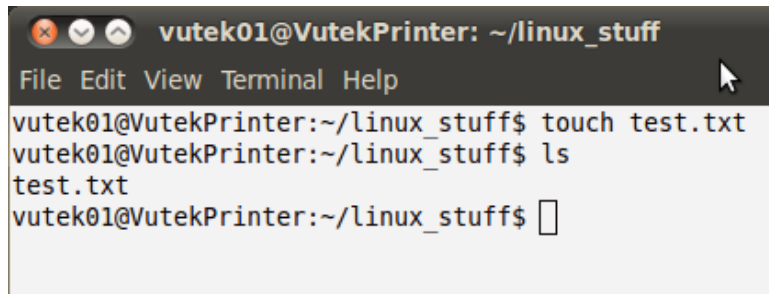
- **cd (change directory)**
  - Changes current working directory
- To change to the directory you have just made, type

  > cd 'directory name'

- To find out what is your current working directory, type

  > pwd

- <u>Exercise</u>: Make another directory inside the current working directory called **mybackups**

Making New Empty File

- **touch (make file)**
  - Creates new empty file
- To create a new directory, type
  touch 'new file name'

- To see the file you have just created, type
  ls

The directories . and ..

- Still in the new directory, type
  ls -a
- As you can see, in the **new** directory (and in all other directories), there are two special directories called (**.**) and (**..**)
- The current directory (.)
  - In Linux, (**.**) means the current directory, so typing
    cd .   NOTE: there is a space between cd and the dot
  - This means stay where you are (the same directory).
- The parent directory (..)
  - (**..**) means the parent of the current directory, so typing
    cd ..   NOTE: there is a space between cd and the dot dot
  - This will take you one directory up the file system (back to your home directory).

Changing to root / home directory


```
vutek01@VutekPrinter: ~
File Edit View Terminal Help
vutek01@VutekPrinter:~/linux_stuff$ pwd
/home/vutek01/linux_stuff
vutek01@VutekPrinter:~/linux_stuff$ cd ~
vutek01@VutekPrinter:~$ pwd
/home/vutek01
vutek01@VutekPrinter:~$
```

```
vutek01@VutekPrinter: /
File Edit View Terminal Help
vutek01@VutekPrinter:~/linux_stuff$ pwd
/home/vutek01/linux_stuff
vutek01@VutekPrinter:~/linux_stuff$ cd /
vutek01@VutekPrinter:/$ pwd
/
vutek01@VutekPrinter:/$
```

- **`cd` or `cd ~` (change to home directory)**
  - Changes to home **(vutek01)** directory
- To change to the home directory, type
       cd or cd ~ NOTE: there is a space between cd and the tilde

- **`cd /` (change to root directory)**
  - Changes to root directory
- To change to the root directory, type
       cd / NOTE: there is a space between cd and the forward slash

Copying Files


```
vutek01@VutekPrinter: ~/linux_stuff
File Edit View Terminal Help
vutek01@VutekPrinter:~/linux_stuff$ ls
test.txt
vutek01@VutekPrinter:~/linux_stuff$ cp test.txt test.backup
vutek01@VutekPrinter:~/linux_stuff$ ls
test.backup   test.txt
vutek01@VutekPrinter:~/linux_stuff$ 
```

- **cp (copy)**
  - Command to copy file or directories
- To copy file use the command in this format

  cp   'source' 'destination'

The Man Pages

- **man (manuals)**
  - Command to display built in manuals
- To view man pages follow this format
  man 'command name'
- **Press 'ctrl+z' to quit**

Summary Basic Line Commands

Command	Meaning
ls	list files and directories
ls -a	list all files and directories
mkdir	make a directory
touch	make a new empty file
cp	Copy file
cd *directory*	change to named directory
cd	change to home-directory
cd ~	change to home-directory
cd ..	change to parent directory
pwd	display the path of the current directory

Linux File System

In Linux, Everything is a File

/ = root file system

vutek
— Import
— Data
— Backups

var
— lib
  — omniorb4
— log
  — vutekd.log

dev
— mapper

usr
— vutek
  — gui
    — vutek
      — logs
      — ServiceList
  — etc
  — bin
    — python
  — sbin

etc
— network
  — •interfaces
— udev
  — rules.d
— init.d
— •vuware.conf
  •hosts
  •hostname

home
— vutek01
  — Downloads
  — Backups
  — Desktop

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```
        ┌──────────────┐
        │ / = root file│
        │   system     │
        └──────┬───────┘
               │
   ┌───────────┘
┌──┴───┐
│ home │
└──┬───┘
   │
┌──┴─────┐
│ vutek01│
└──┬─────┘
   │
┌──┼──────┬────────┐
│         │        │
┌──────────┐ ┌─────────┐ ┌─────────┐
│Downloads │ │ Backups │ │ Desktop │
└──────────┘ └─────────┘ └─────────┘
```
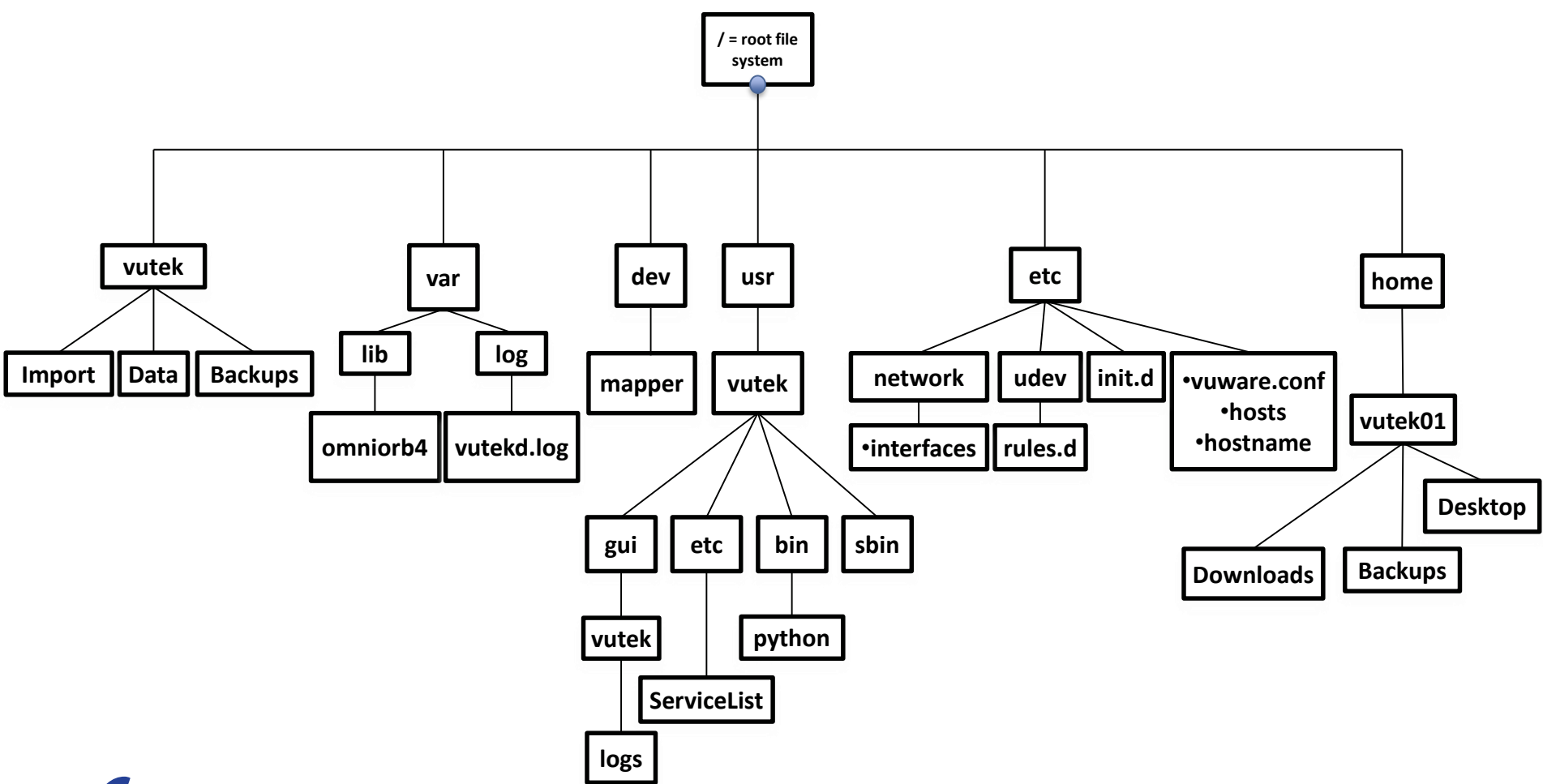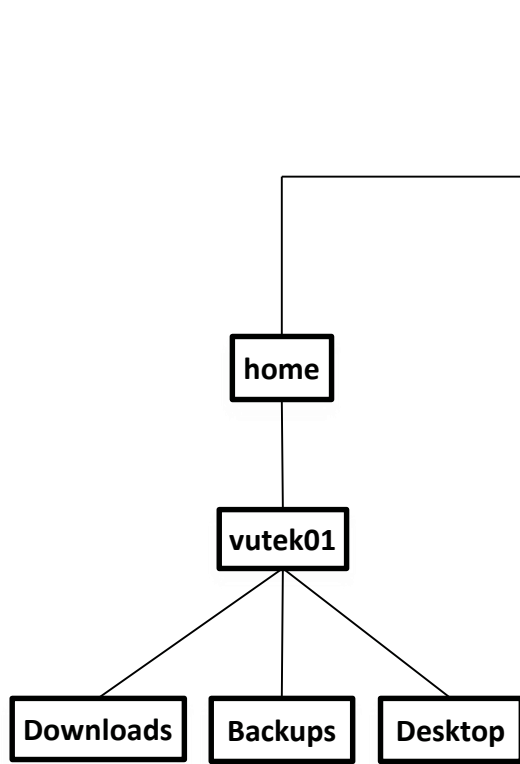
- Home (Vutek01)

  Default directory when starting terminal window.

- Backups

  Export / Import location of VUI database backups.

- Downloads

  Location of any files downloaded using internet browser.

- Desktop

  Location of any files displayed on Linux desktop.

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```
                        ┌──────────────┐
                        │ / = root file│
                        │    system    │
                        └──────┬───────┘
                               │
          ┌────────────────────┘
          │
    ┌─────────┐
    │   etc   │
    └────┬────┘
   ┌─────┼──────┬───────────┐
   │     │      │           │
┌──────┐┌────┐┌──────┐┌──────────────┐
│network││udev││init.d││•vuware.conf  │
└──┬───┘└─┬──┘└──────┘│  •hosts       │
   │      │           │  •hostname    │
┌────────┐┌────────┐  └──────────────┘
│•interfaces││rules.d│
└────────┘└────────┘
```

- **etc   (Editable Text Configuration)**
  Static Linux configuration files.
  - **vuware.conf** - Contains printer serial # and machine type.
  - **hosts** - host file used for print networking
  - **hostname** - network name default "VutekPrinter"

- **init.d**
  Linux initialization shell scripts - Inludes "Vutekd"
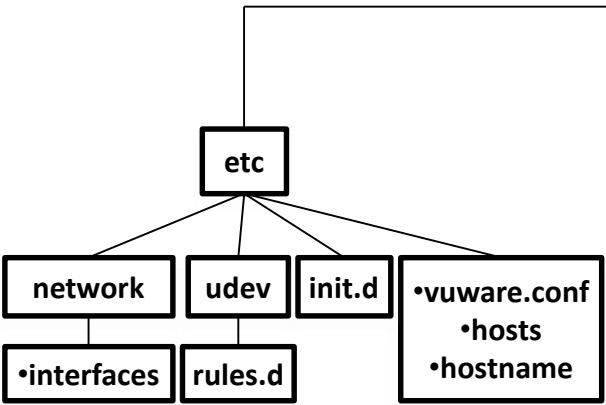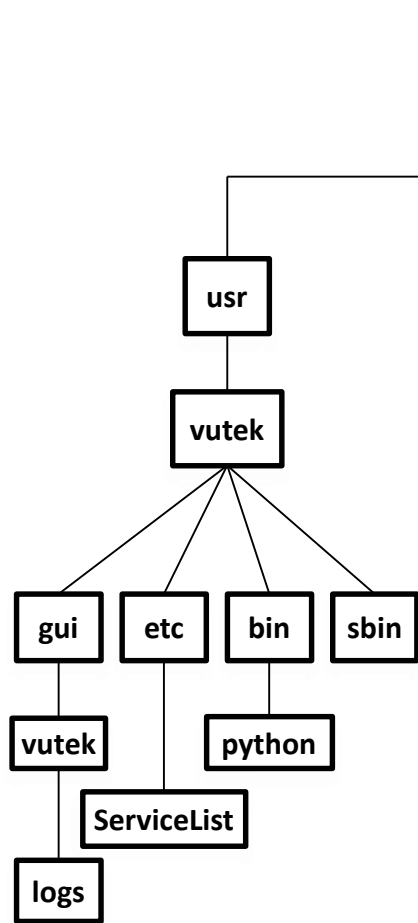 The "d" stands for daemon

- **udev/rules.d**
  Dynamic device manager for Linux .
  "**70-persistent-net.rules**" file stores the MAC addresses for the onboard network ports.

- **network**
  "**interfaces**" file stores the onboard Ethernet configuration.
  "eth0" internal network static IP (192.168.14.42)
  "eth1" external / customer network setting VUI accessible.

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```
/ = root file
system
```

- usr
  - vutek
    - gui
      - vutek
        - logs
    - etc
      - ServiceList
    - bin
      - python
    - sbin

- **usr (user utilities and applications)**
  Contains the majority of utilities and applications
- **vutek**
  Location of Vutek software, utilities, configuration files.
- **vutek/bin**
  Vutek specific command binary files.
  Location of **RunRoger.py** or **RunZapp.py**
- **vutek/sbin**
  Vutek specific system binary files.
  Location of scripts like **ResetNetwork.sh**
- **vutek/etc/ServiceList**
  Location of printer **XML** (Extensible Markup Language) files.
  Human and machine-readable configuration files.
- **vutek/gui/vutek/logs**
  Location of VUI (vutek user interface) or GUI log files.

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```
/ = root file
system
```

- **var**
  - **lib**
    - **omniorb4**
  - **log**
    - **vutekd.log**
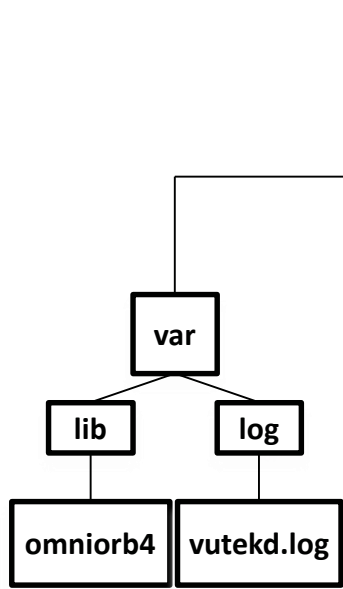
- var (Variable Files)

  Files whose content is expected to continually change during normal operation of the system – such as log files.

- var/log

  Various linux system logs.
  "**vutekd.log**" – Vutek software log
  "**dmesg**" – Linux kernel message log.
  "**dtmon.log**" – HS100/HS125 Specific Delta Tau log.
  "**jdfserverd.log**" – Vutek JDF connector server log.

- udev/rules.d

  Dynamic device manager for Linux .
  "**70-persistent-net.rules**" file stores the MAC addresses for the onboard network ports.

- lib/ommiorb4 (Object request broker)

  CORBA - (Common Object Request Broker Architecture) Middleware that allows software to communicate to vutek printer hardware.

```
/ = root file
    system
```

vutek

Import | Data | Backups

- `vutek  (RAID mount point)`

  Linux system RAID drives are mounted at **/vutek**

  Location of customer image files, network shared Import folder, system database backups.

- `Import`

  Location of network shared folder.
  Link on Desktop points to Import folder on RAID.

- `Data`

  Location of customer image files after loading into VUI.
  Each folder under Data contains unique image RTL, XML, Bitmap

- `Backups`

  Location of automatic system database backup (HS100/HS125)

```
┌──────────────┐
│ / = root file│
│   system     │
└──────●───────┘
```

```
┌──────┐
│ dev  │
└──●───┘
┌────────┐
│ mapper │
└────────┘
```

- `dev   (Device Files)`

  Allows programs to talk to physical devices

  /dev/tty There are three types of tty devices: consoles, serial ports and pseudo devices.

- `dev/mapper`

  When RAID is configured at bios level, ISW file points the system back to the physical drive volume.

```
/ = root file
system
```

```
dev
```

```
mapper
```

• dev/mapper (continued)

Terminal Command **df -h**

Note the RAID is mounted on /vutek and the /dev/mapper/isw file is listed.

```
⊗ ⌄ ⌃   vutek01@VutekPrinter: ~
File  Edit  View  Terminal  Help
vutek01@VutekPrinter:~$ df -h
Filesystem            Size  Used Avail Use% Mounted on
/dev/sda2             1.8T   11G  1.7T   1% /
none                  7.4G  2.0M  7.4G   1% /dev
none                  7.4G  176K  7.4G   1% /dev/shm
none                  7.4G  316K  7.4G   1% /var/run
none                  7.4G     0  7.4G   0% /var/lock
none                  7.4G     0  7.4G   0% /lib/init/rw
/dev/mapper/isw_baedjcjfdc_RAID
                      3.6T  1.7G  3.4T   1% /vutek
```
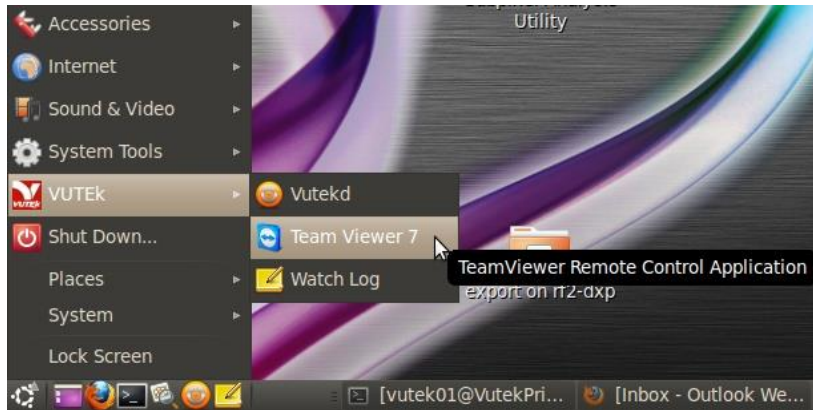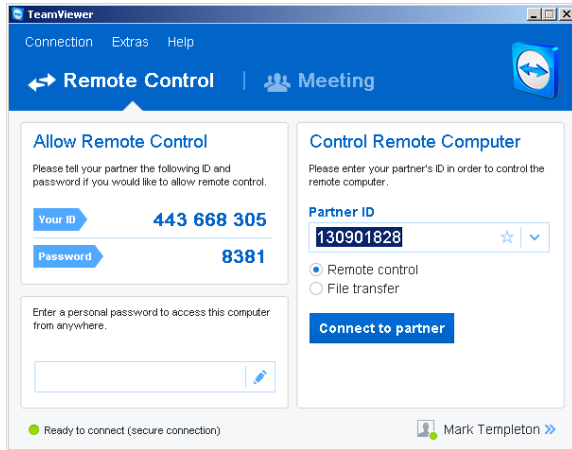
EFI Remote Assistance

Teamviewer remote desktop viewer

Teamvier Remote Desktop Viewer

- **Teamviewer 7**
  - Application to view remote desktop
- Pre-Installed on GS Pro and HS Pro

Teamvier Remote Desktop Viewer

- **Teamviewer 7**
  - **Older GS will need separate install**
  - **Log into Nexus to download linux (32bit) version**

```
ssh –R 2424:localhost:22 hedwards@65.175.143.66
Password = 1apple1
```

```
./deliver_teamviewer 2424
```