Spectrum of desktop flavours

- **X terminals**
  - simple HW running an X-server
  - User processes run on another UNIX server

- **diskless client**
  - standard computer running UNIX (Linux), SW is on fileserver
  - User processes run on the client

- **PC client**
  - "standard" PC running UNIX (Linux), some SW is stored local
  - User processes run on the client

- **Stand alone system**
  - "standard" PC running UNIX (Linux), all SW is stored local
  - User and server processes run on this system

**Light weight** to **heavy weight**
Users, Desktops and Servers
User visible entities and enabling software

User visible entities

- Virtual console
- Tool
- Tool
- Session
- Virtual console
- Virtual console
- Desktop machine

The invisible software

- Tool process
- Tool process
- Window manager
- Infrastructure daemons
- Console daemons
- Kernel
Typical Linux file hierarchy

- `/boot`: boot data
- `/etc`: configuration data
- `/bin`: executables for system administration
- `/sbin`: executables for system administration
- `/lib`: shared libraries
- `/tmp`: temporary files
- `/var`: spool files
- `/usr`: shareable read only files (e.g. programs, include files, documentation)
- `/home`: user data

For a basic system, to be able to run in single user mode:

- `/etc`: site wide configuration data
- `/bin`: executables
- `/sbin`: sysadmin executables
- `/lib`: X-Windows architecture independent data
- `/share`: spell check data
- `/man`: site specific?
- `/local`: should reside under `/share` according HFS
- `/doc`: sources
- `/info`: version: 0

Gerrit Muller
A Visual Introduction to Linux
## File hierarchy allocation

<table>
<thead>
<tr>
<th></th>
<th>Minimal PC</th>
<th>Server</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>system specific</strong></td>
<td>shareable, required for booting</td>
<td>shareable</td>
</tr>
<tr>
<td>&quot;static&quot;</td>
<td>/etc</td>
<td>/bin</td>
</tr>
<tr>
<td></td>
<td>/boot</td>
<td>/sbin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>/lib</td>
</tr>
<tr>
<td><strong>variable</strong></td>
<td>/var/run</td>
<td>/var/log</td>
</tr>
<tr>
<td></td>
<td>/var/lock</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>/var/mail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>/var/spool</td>
</tr>
<tr>
<td></td>
<td></td>
<td>/home</td>
</tr>
</tbody>
</table>
Typical Linux Startup Sequence

BIOS Boot
  ↓
LILO
  ↓
Kernel Boot
  ↓
Init
  ↓
/etc/inittab
  ↓
SysInit
  ↓
/etc/rc.d/rc.sysinit
  ↓
initialize kernel
  ↓
detect hardware
  ↓
RC5
  ↓
/etc/rc.d/rc5.d
  ↓
RC local
  ↓
/etc/rc.d/rc.local
  ↓
Login
  ↓
/etc/profile
  ↓
/home/<user>/ .Xdefaults
  ↓
/home/<user>/ .bashrc
  ↓
Start application
  ↓
/etc/bashrc
  ↓
OS independent Boot
  ↓
general purpose Boot
  ↓
Boot manager
  ↓
initialize kernel
  ↓
detect hardware
  ↓
initialize system
  ↓
start services
  ↓
start session
  ↓
start process
Layering of Network Addressing

- **Domain Name**: `quark.physics.groucho.edu`
- **Hostname Resolution (DNS)**
- **IP Address**: `149.76.12.4`
- **Ethernet Address**: `0x954C0C04`
- **ARP**
- **RARP**
- **Reverse Address Name Resolution Protocol**
- **Protocol**

**Resolutions**
- **Human**
- **Runtime**
- **HW**