

Linux and OpenVMS Interoperability

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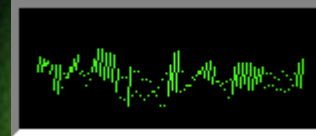
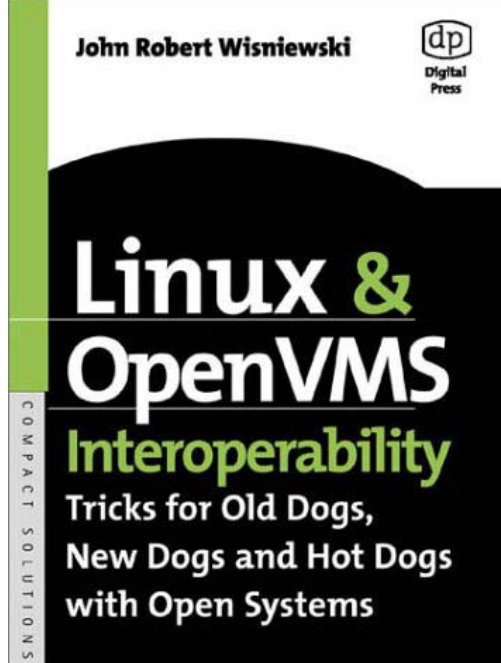
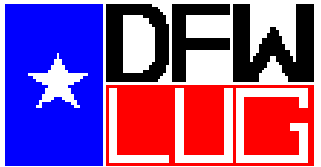
Hewlett Packard

Session # 2453

Room B403

8/15/03 8:00am

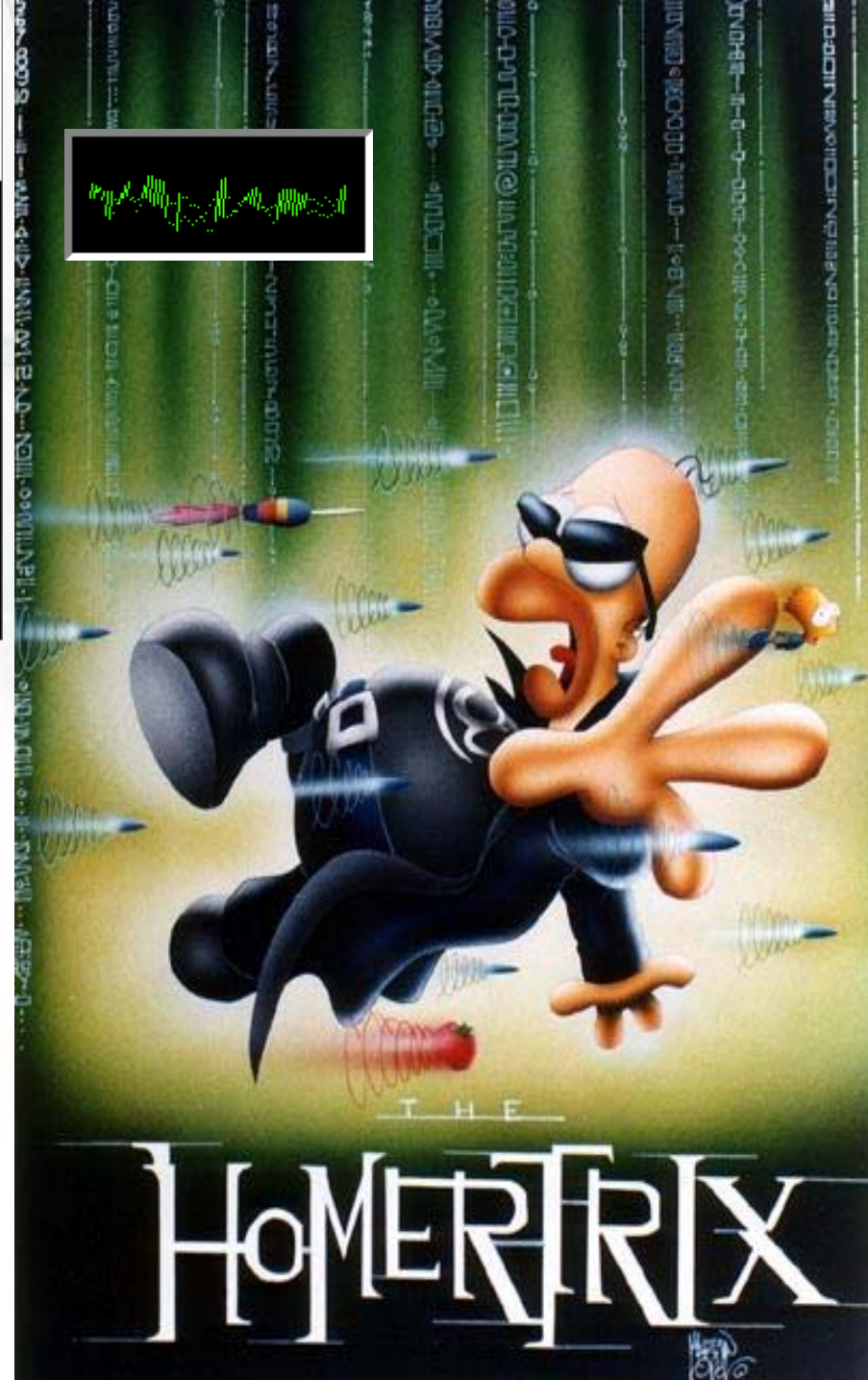




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■ Linux and OpenVMS Interoperability

■ Tricks for Old Dogs, New dogs, and Hot Dogs with Open Systems

■ ISBN 1-55558-267-2

■ Chpt1 Linux and OpenVMS Similarities, Differences, and Common Features

■ Chpt2 Breaking into OpenVMS and Linux Systems

■ Chpt3 TCP/IP Networking between OpenVMS and Linux

■ Chpt4 OpenVMS and Linux Security

■ Chpt5 Linux and OpenVMS Xwindow interoperability

■ Chpt6 OpenVMS and Linux E-mail

■ Chpt7 OpenVMS Advanced Server and Linux SAMBA with Windows Clients

■ Chpt8 Apache web server for OpenVMS and Linux

■ Appendix OpenVMS to Linux Compendium of Open Source Tools:-)

Some OSes are not just a lifestyle



TUX vs Albert

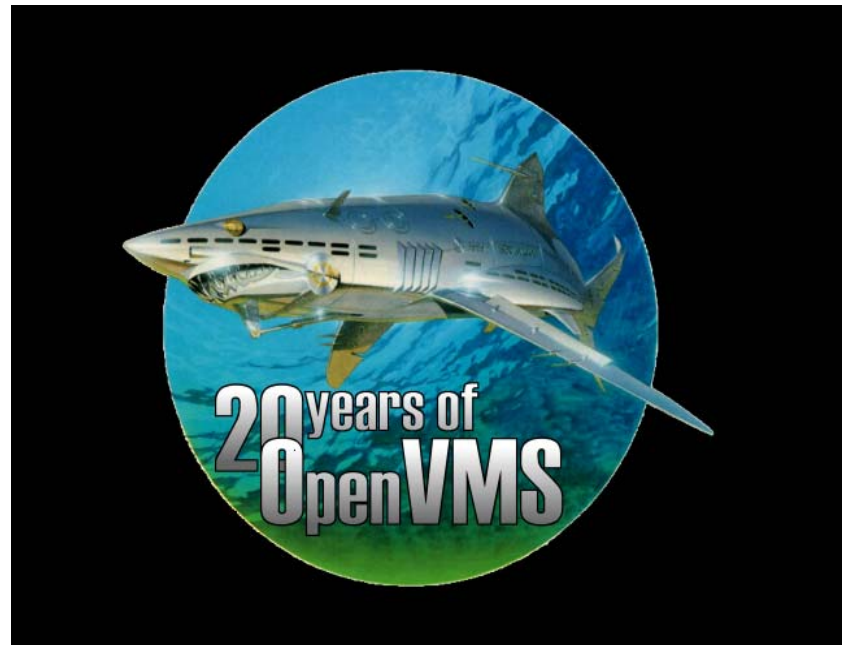
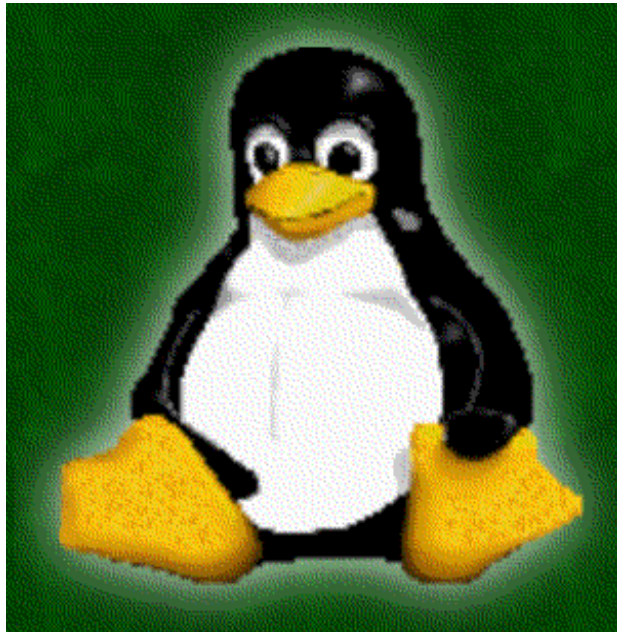
- **BATTLE OF THE 32-Bit MASCOTS**
 - Figuring the Odds:
 - Penguins are almost chickens
 - Cats freeze to death in the Artic.



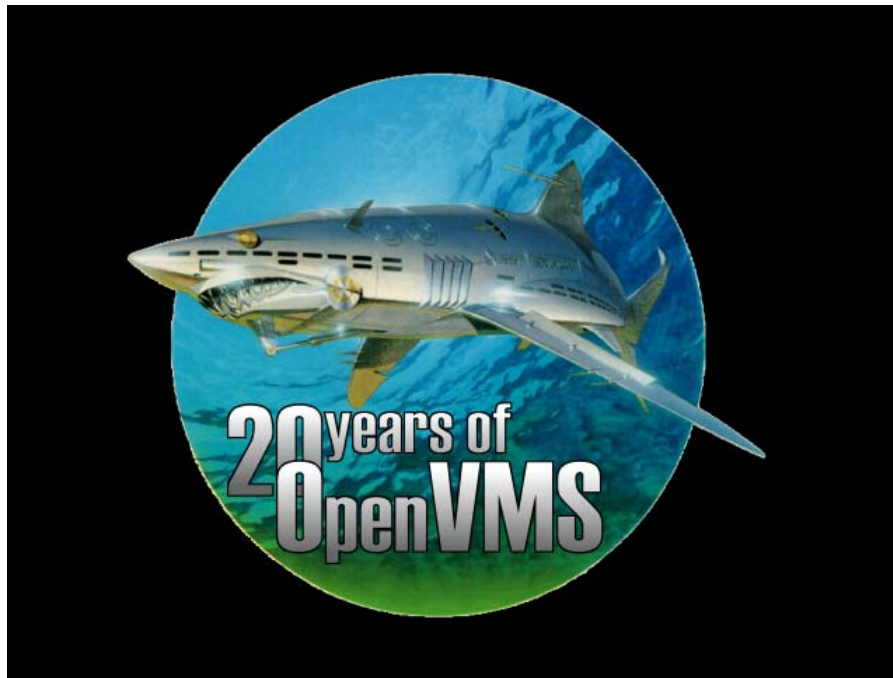
TUX vs Vernon

Battle of 64-bit OS mascots

There is this natural relationship between Sharks and Penguins enough said.



OpenVMS and Linux Together on the same network?



BORN TO FRAG



OpenVMS and Linux

- SIMILIARITIES
- Rabid loyal installed base of users
- Internet Ready
- Standard Environments
- Standard Protocols
- Xwindows Not MS Windows
- And both have a rabid, loyal installed base of users!

OpenVMS and Linux

- DIFFERENCES
- Vendor Maintained Vs Open Source
- Scaling and Performance
- Native File Systems
- VMS / Unix design differences
- VMS Clustering and Beowulf clusters
- Rabid loyal installed base of Users

OpenVMS and Linux

- AREAS OF INTEROPERABILITY
- File Exchange File Systems blending
- Terminal / CLI
- Email
- Xwindows

OpenVMS and Linux

File Exchange File Systems blending

- TCP/IP FTP
- DECnet for Linux (and DECnet copy)
- NFS (Network File System from the Unix world)
- SAMBA (For VMS and Linux from the MS world)
- Advanced Server (for VMS from the MS world)

OpenVMS and Linux

Terminal Interchange

- Telnet VT Terminal support
- Terminal sessions can control VMS and Linux Systems
- Most Utilities work from a Command Line Interface
- Shell languages are different (DCL/BASH)
- Editors are different (EDT-TPU / VI – EMACS)

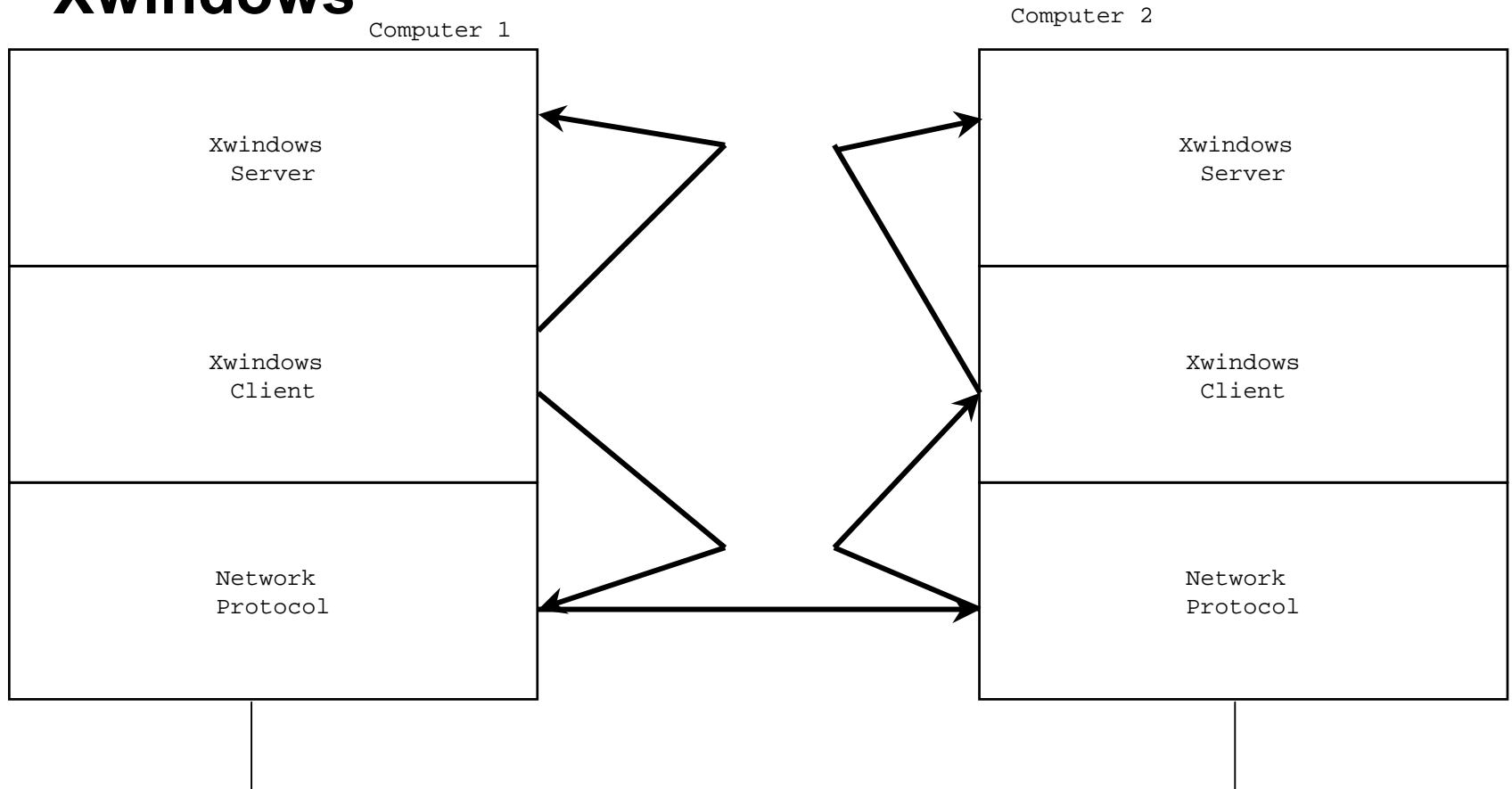
OpenVMS and Linux

Email

- Both systems come with SMTP
- NETscape/Mozilla are excellent Free Email Clients
- <http://www.bynari.com/> Bynari Systems of Dallas Texas has Linux (Open Source) Exchange Clients and Exchange Servers for use with Exchange Mail systems

Xwindows Network Paths

■ Xwindows



OpenVMS and Linux

■ Xwindows

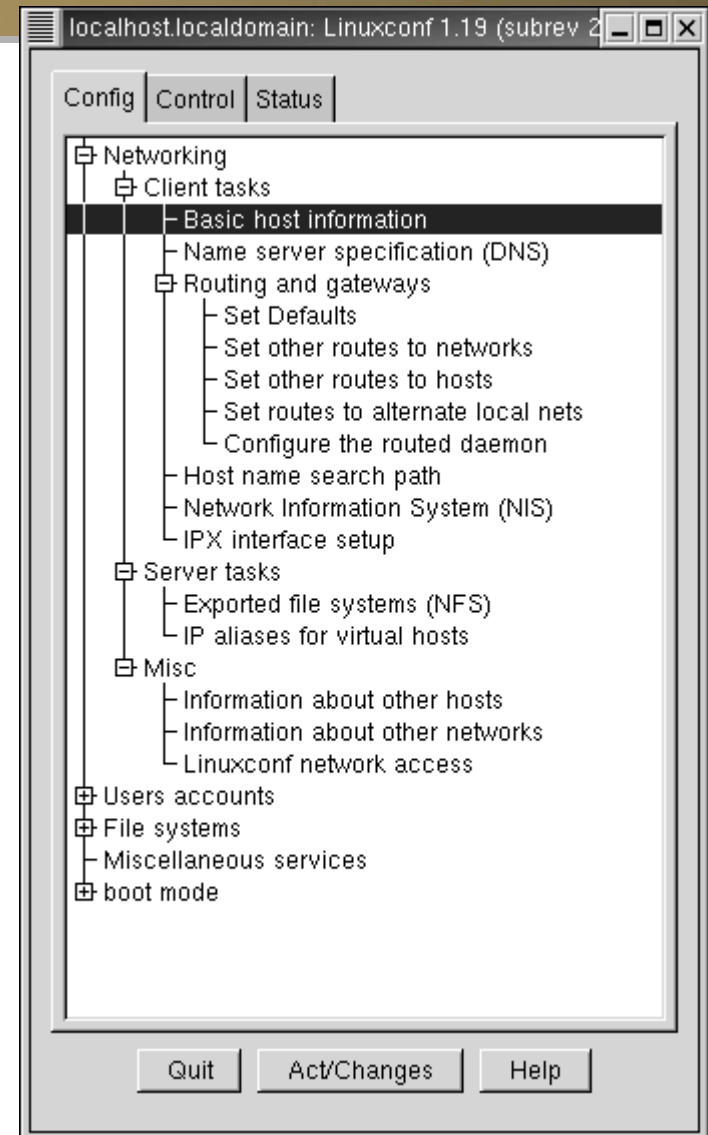
System Management

From a Menu

Linux – Linuxconfig

VMS – TNT Agent

InsightMgr XE Agent



OpenVMS and Linux

■ Xwindows Application Example

■ Step 1 Authorize OpenVMS Xserver to display

- With the `xhost` command on your Linux box controls who can write to your Xwindow Server display.
- `xhost +` allows every host in your network to send Xwindow displays to your screen
- `xhost -` allow no one in your network to send Xwindow displays to your screen
- `xhost +nodename.com` allows just “nodename.com” to send Xwindow displays to your screen.
- `xhost` with no arguments tells you who is authorized to send Xwindow displays to your screen
- Remember you can always block all Networked Xwindow Displays by typing “`xhost -`” on a local Linux terminal window

OpenVMS

- On your Lin
- xhost +
- telnet

```

johnw@lnxone.vmsone.com: /home/johnw <3>
File Sessions Options Help

[johnw@lnxone johnw]$ xhost +vmsone.com
vmsone.com being added to access control list
[johnw@lnxone johnw]$ telnet vmsone.com
Trying 65.64.220.210...
Connected to vmsone.com.
Escape character is '^'.

Welcome to OpenVMS (TM) Alpha Operating System, Version V7.2-1

Username: wisniewski
Password:

*****
*                                     *
*           WELCOME TO OpenVMS V7.2-1   *
*                On vmsone.com          *
*                                     *
* Remember: The "Open" Prefix is Always *
*                Silent                  *
*                                     *
*****

Last interactive login on Monday, 21-MAY-2001 23:37:35.10
Last non-interactive login on Monday, 21-MAY-2001 23:39:22.40
$
$ set display/create/node=lnxone.vmsone.com/transport=tcpip/screen=0
$ create/term

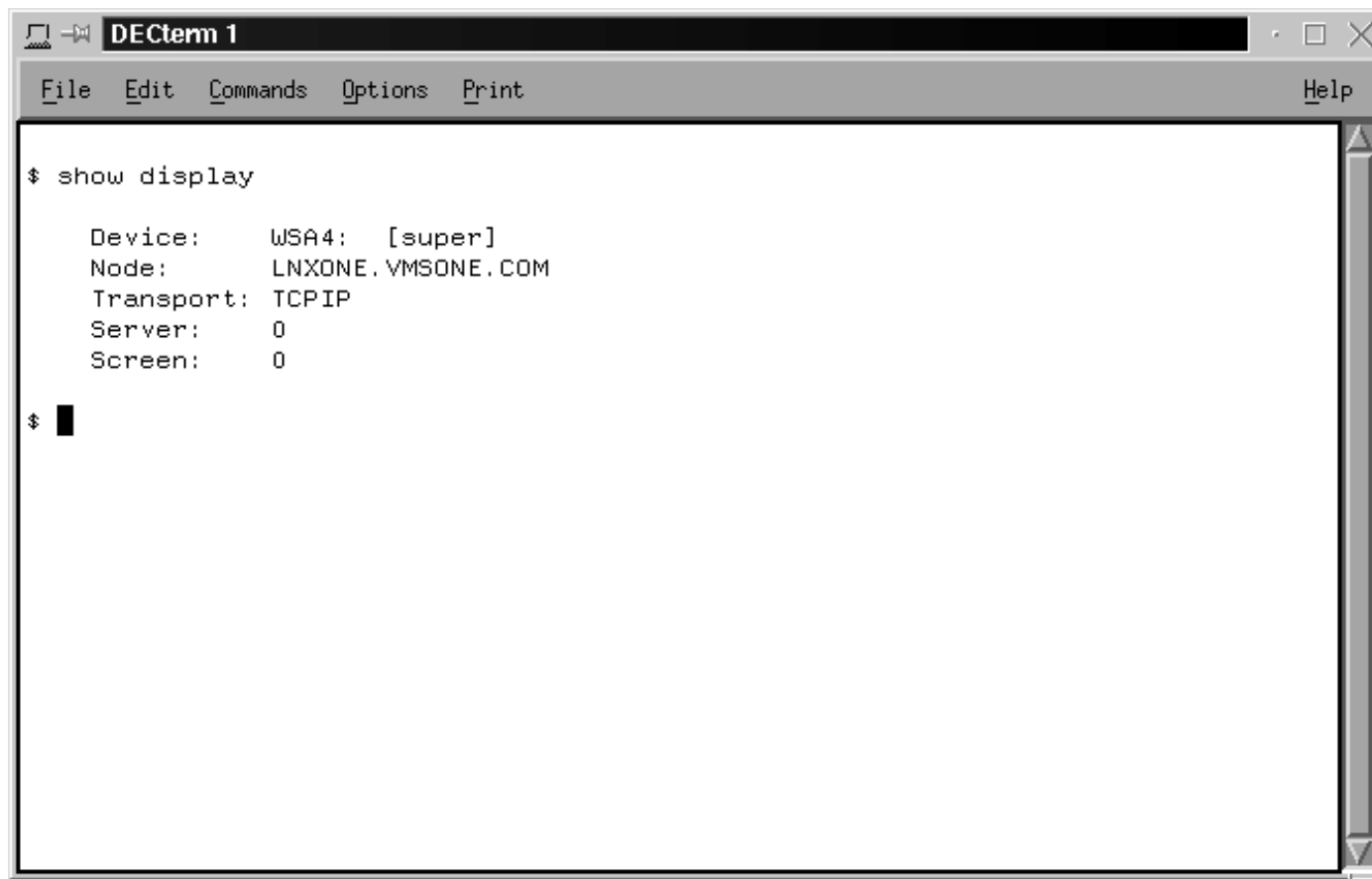
```

OpenVMS and Linux

- **Xwindows then as you are logged into VMS window**
- **\$set display/create/node=lnxone.vmsone.com-
/transport=tcpip/ screen=0**

OpenVMS and Linux

■ Xwindows VMS \$SHOW DISPLAY



The image shows a screenshot of a DECterm window titled "DECterm 1". The window has a menu bar with "File", "Edit", "Commands", "Options", "Print", and "Help". The main area displays the output of the command "\$ show display". The output is as follows:

```
$ show display  
  
Device:   WSA4:  [super]  
Node:     LNXONE.VMSONE.COM  
Transport: TCPIP  
Server:   0  
Screen:   0  
  
$ █
```

OpenVMS and Linux

- **Xwindows then as you are logged into VMS window**
- **\$CREATE/TERM**

The screenshot shows a Red Hat Linux desktop environment. On the left is a vertical panel with icons for 'Autostart', 'Printer', 'Red Hat Errata', 'Red Hat Support', 'Templates', 'Trash', 'cdrom', 'floppy', and 'www.redhat.com'. The desktop background is dark. Two terminal windows are open:

- Terminal Window 1:** Title bar: `johnw@lnxone.vmsone.com: /home/johnw <3>`. It shows the execution of `xhost +vmsone.com` and `telnet vmsone.com`. The telnet session connects to `vmsone.com` and displays a welcome message for OpenVMS (TM) Alpha Operating System, Version V7.2-1. It prompts for a username (wisniewski) and password. A large asterisk-delimited banner follows, containing the text:


```
*****
*                               *
*      WELCOME TO OpenVMS V7.2-1   *
*      On vmsone.com               *
*                               *
* is Always                       *
*                               *
*****
Y-2001 23:37:35.10
1-MAY-2001 23:39:22.40
/transport=tcpip/screen=0
```
- Terminal Window 2:** Title bar: `DECTerm 1`. It shows a blank command prompt with a dollar sign (`$`).

The taskbar at the bottom contains window management buttons labeled 'One', 'Three', 'Two', and 'Four', along with system tray icons for network, volume, and power. The system clock in the bottom right corner shows '11:50PM Jun 14'.

OpenVMS and Linux

■ Xwindows & VMS Applications

The screenshot shows a terminal window titled "johnw@lnxone.vmsone.com: /home/johnw <2>". The terminal displays the command "\$ dir sys\$system:decw*" and its output, which is a directory listing of various DECW applications. The applications are listed in two columns, with their names and file sizes (e.g., .EXE;1 or .EXE;2). The listing includes applications like DECW#BOOKREADER, DECW#CALC, DECW#CALENDAR, DECW#CARDFILER, DECW#CBI, DECW#CLOCK, DECW#DWT_DECNET, DECW#DWT_FONT_DAEMON, DECW#DWT_STARTXTDRIVER, DECW#ENDSESSION, DECW#FONTCOMPILER, DECW#MAIL, DECW#MESSAGEPANEL, DECW#MWM, DECW#MWM_OVERLAY, DECW#NOTEPAD, DECW#PAINT, DECW#PAUSESESSION, DECW#PRINTSCREEN, DECW#PUZZLE, DECW#REINIT, DECW#SERVER_GUBRM, DECW#SERVER_PVRM, DECW#SESSION, DECW#SETSHODIS, DECW#STARTLOGIN, DECW#TABLET, DECW#TERMINAL, DECW#TERMINAL_CREATE, DECW#UILMOTIF, DECW#WAITFORMSM, DECW#WINMGR, DECW#WML, DECW#WSCUST, DECW#WSINIT, and DECW#XFS. The terminal concludes with "Total of 37 files." and a prompt "\$".

```

johnw@lnxone.vmsone.com: /home/johnw <2>
File Sessions Options Help
$ dir sys$system:decw*

Directory SYS#COMMON:[SYSEXE]

DECW#BOOKREADER.EXE;1      DECW#CALC.EXE;1      DECW#CALENDAR.EXE;1
DECW#CARDFILER.EXE;1      DECW#CBI.EXE;1      DECW#CLOCK.EXE;1
DECW#DWT_DECNET.EXE;1     DECW#DWT_FONT_DAEMON.EXE;1
DECW#DWT_STARTXTDRIVER.EXE;1
DECW#FONTCOMPILER.EXE;1   DECW#ENDSESSION.EXE;1
DECW#MESSAGEPANEL.EXE;1  DECW#MAIL.EXE;1
DECW#MWM.EXE;1            DECW#MWM_OVERLAY.EXE;1
DECW#NOTEPAD.EXE;1      DECW#PAINT.EXE;1
DECW#PAUSESESSION.EXE;1  DECW#PRINTSCREEN.EXE;1
DECW#PUZZLE.EXE;1      DECW#REINIT.EXE;1   DECW#SERVER_GUBRM.EXE;1
DECW#SERVER_MAIN.EXE;1   DECW#SERVER_PVRM.EXE;2
DECW#SESSION.EXE;1      DECW#SETSHODIS.EXE;1
DECW#STARTLOGIN.EXE;1    DECW#TABLET.EXE;1   DECW#TERMINAL.EXE;1
DECW#TERMINAL_CREATE.EXE;1
DECW#UILMOTIF.EXE;1
DECW#WAITFORMSM.EXE;1    DECW#WINMGR.EXE;1   DECW#WML.EXE;1
DECW#WSCUST.EXE;1      DECW#WSINIT.EXE;1   DECW#XFS.EXE;1

Total of 37 files.
$

```

OpenVMS and Linux

- **Xwindows Summary**
- **Set Linux Xwindow write security Xhost +**
- **Login to VMS**

On VMS system

\$set display/create

run application or create terminal e.g.

\$run sys\$system:decw\$clock

\$create/term

Have fun redisplaying VMS Xwindows

Break into Linux in 10 steps!

- **Linux / Redhat Root Password change**
- **1) Have physical access to the Linux system**
- **2) boot Redhat Linux CDrom distribution disk 1**
- **3) type in "linux rescue" as the boot choice**
- **4) choose English (or your local language)**
- **US Keyboard (or your local variant)**
- **MESSAGES:**
- **running anaconda -- please wait ...**
- **5) Choose "Continue" when asked to mount your linux installation**
- **(don't chose "read-only")**
- **MESSAGES:**
- **Searching for Redhat Installation...**
- **Your image has been mounted under**
- **/mnt/sysimage/**

Break into Linux in 10 steps

- **6) Enter a return to get a shell "Ok"**
- Prompt
- sh-2.05a#
- **7) Change root to the mounted file system**
- sh-2.05a# chroot /mnt/sysimage
- **8) change root password**
- sh-2.05a# passwd root
- New Password:Welcome1 (not echoed)
- Retype new password:Welcome1 (not echoed)
- passwd: all authentication tokens updated successfully
- **9)Exit the shell and shutdown the system**
- sh-2.05a# exit
- **10) remove the Redhat Install CDrom and reboot from the Hard drive.**
- **The Root Password will now be Welcome1**
- When the linux system reboots login as root.
-
- **Congratulations, you've just broken into a Linux System!**

Breaking into an OpenVMS System

- 1) Have physical access to the OpenVMS system
- 2) Reboot / Hault the boot process (find the reset button on your Alpha) and
■ find yourself at a three chevron prompt ">>>"
- 3) For most Alphas boot with the "Conversational Boot" Flag set
- >>>boot -flag 0,1 (!0 refers to the cluster "system software" directory you want to boot from)
- 4) At the "SYSBOOT>" prompt you can change any VMS SYSGEN PARAMETERS BEFORE THE SYSTEM RUNS!

But John, How can I share Files?

File and Printer Sharing

- SMB Disk Sharing, Not just for Windows Anymore
- SAMBA for OpenVMS and Linux
- Advanced Server for VMS (from VMS Engineering)

What is Samba?

sam·ba (sam' ba) n.

1. A Brazilian ballroom dance of African origin.
2. Music in 4/4 time for performing this dance.
3. An OpenSource SMB server

One more time in English

Just what in the heck is Samba:

Open Source (under the GNU License) SMB Server
for Linux, VMS, and Unix.

Windows File and Print Services for non MS
Operating Systems

For the recently initiated

- SAMBA is a free implementation of an SMB (Server Message Block Protocol)
- Windows PCs utilize SMB Protocols (recently renamed by Bill and Company to CIFS (Common Internet File System) to access remote file systems and printers.
- These resources are also known as shares or services in Bill speak.

Samba's Features

- 1) Act as a NetBIOS nameserver
- 2) Participate in NetBIOS browsing and browse master elections
- 3) Act as an SMB client and access shares or printers on other SMB servers
- 4) Backup local SMB shares to remote SMB shares
- 5) A CLI for limited remote administration for WNT servers and other SAMBA servers.
- 6) Be a Domain Controller for Windows 9x, and WFW clients.
■ (Work is underway for NT 3.51/4.0 Domain Control too!)

So what do you do with Samba?

- 1) Replace a WNT file/print server and save the license cost
- 2) Provide a gateway for synchronizing Linux and Windows Passwords.
- 3) Act as a single “Home Directory” server Linux and Windows home directories exist in a common space
- 4) Act as a print gateway between Linux and PC networked printers
- 5) Allow Linux machines to access Window based file shares.

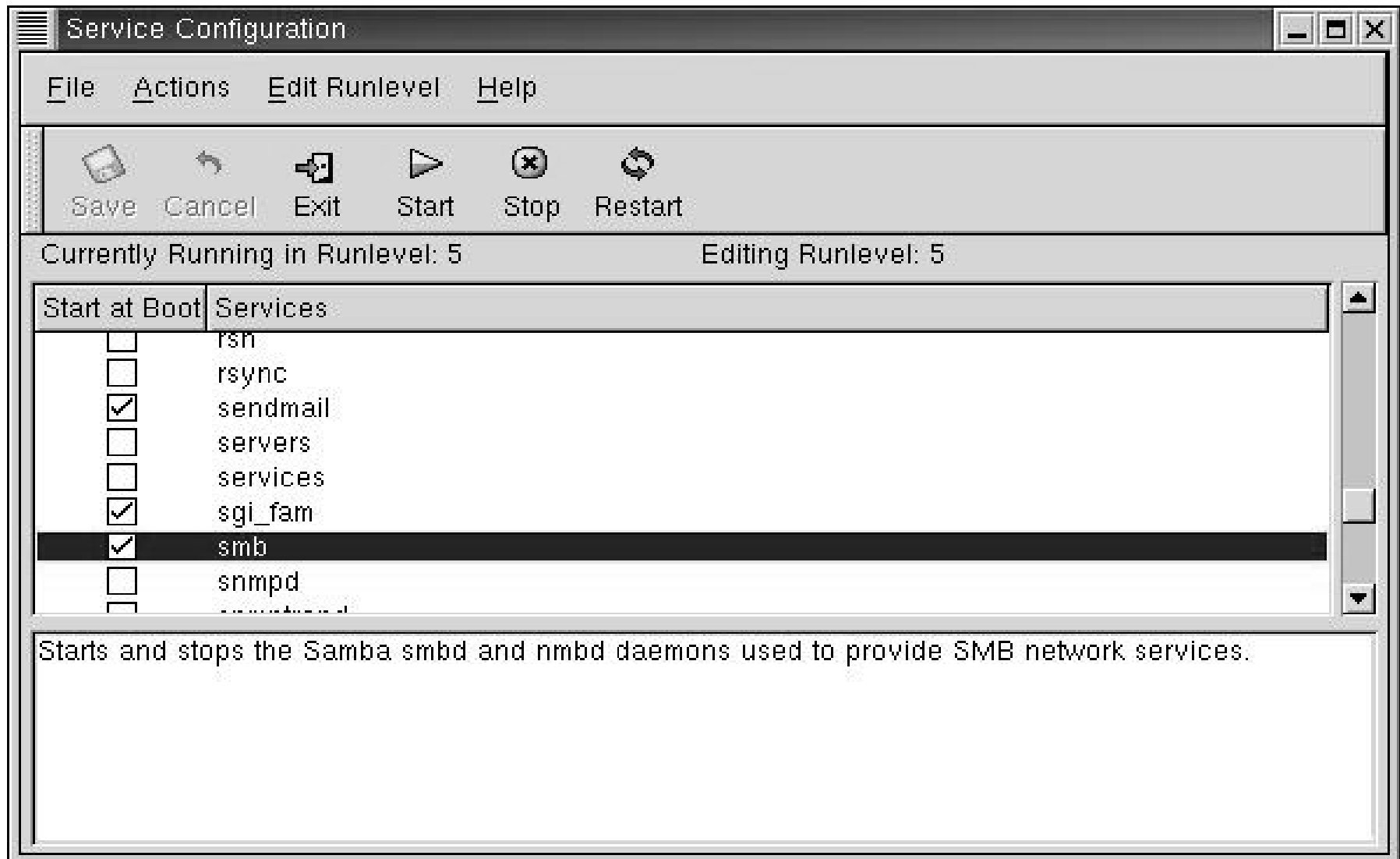
Where Can I get SAMBA?

- [Http://www.samba.org/](http://www.samba.org/)
 - -- The SAMBA homepage for Linux

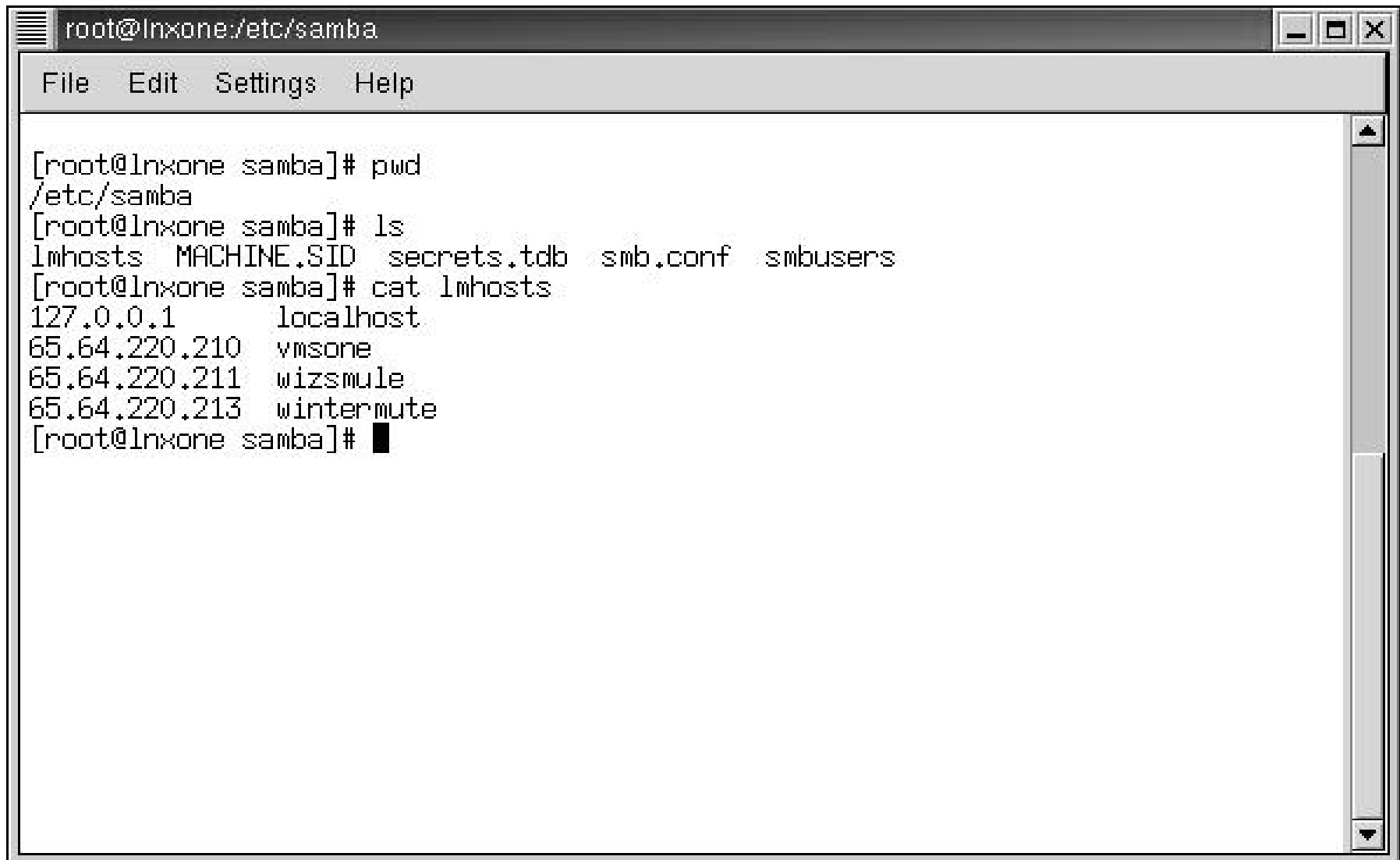
- <http://ifn03.ifn.ing.tu-bs.de/ifn/sonst/samba-vms.html>
 - -- The Samba OpenVMS Homepage

- The CD in the back of one of those expensive Barnes and Noble Computer books...

Configuring Samba on Linux



Step 2 add Authorized Systems



A terminal window titled 'root@lnxone:/etc/samba' with a menu bar (File, Edit, Settings, Help) and window control buttons. The terminal output shows the following commands and results:

```
root@lnxone:/etc/samba
File Edit Settings Help

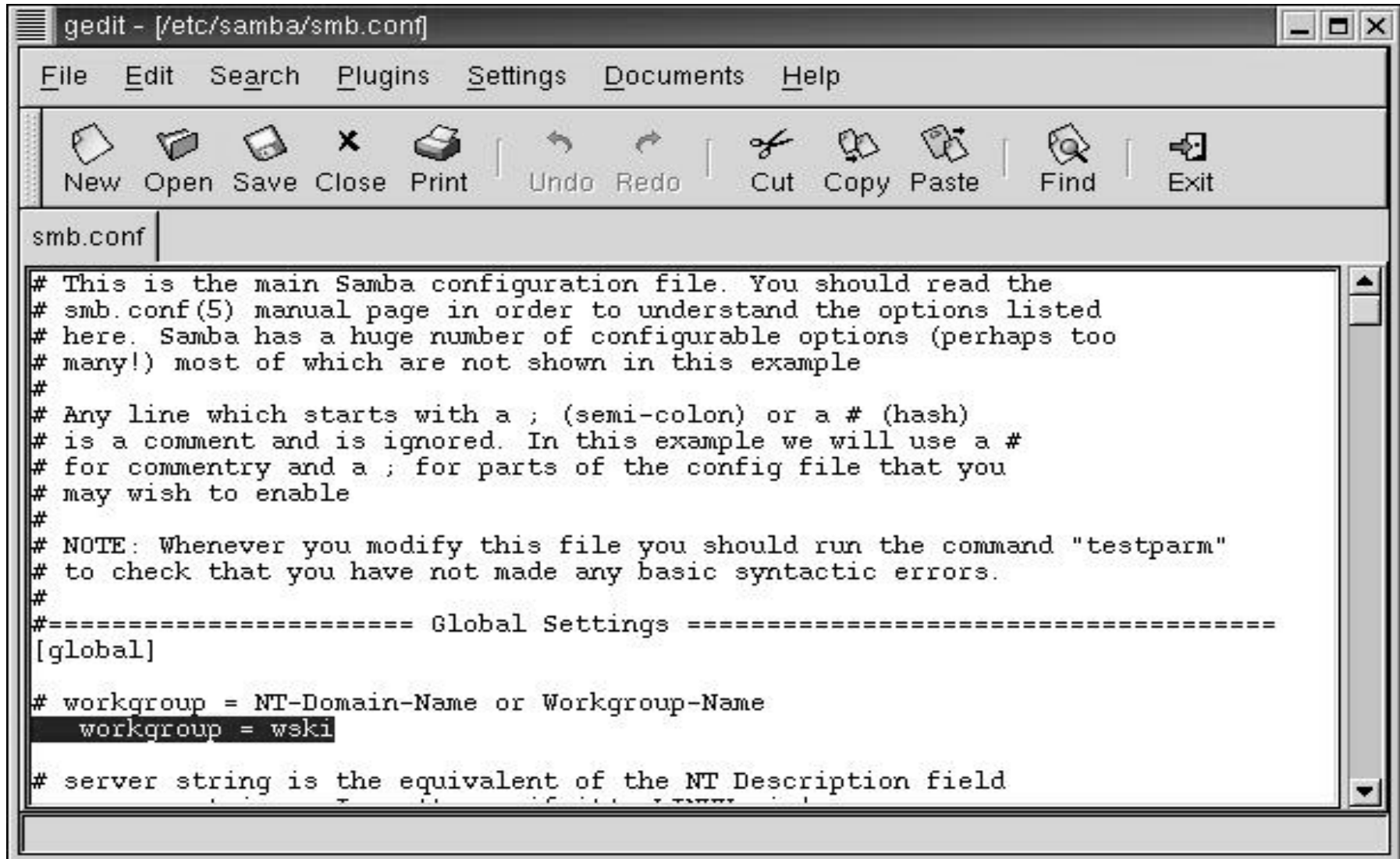
[root@lnxone samba]# pwd
/etc/samba
[root@lnxone samba]# ls
lmhosts MACHINE.SID secrets.tdb smb.conf smbusers
[root@lnxone samba]# cat lmhosts
127.0.0.1 localhost
65.64.220.210 vmsone
65.64.220.211 wizsmule
65.64.220.213 wintermute
[root@lnxone samba]# █
```

Step 3 add SMB users(map to Linux Users)

```
root@lnxone:/etc/samba
File Edit Settings Help

[root@lnxone samba]# pwd
/etc/samba
[root@lnxone samba]# ls
lmhosts MACHINE.SID secrets.tdb smb.conf smbusers
[root@lnxone samba]# cat lmhosts
127.0.0.1 localhost
65.64.220.210 vmsone
65.64.220.211 wizsmule
65.64.220.213 wintermute
[root@lnxone samba]#
[root@lnxone samba]# cat smbusers
# Unix_name = SMB_name1 SMB_name2 ...
root = administrator admin
nobody = guest pcguest smbguest
johnw = johnw
steves = steves
jennaw = jennaw
smb_pub = smb_pub
[root@lnxone samba]# █
```

Step 4 Edit the smb.conf file



```

gedit - [/etc/samba/smb.conf]
File Edit Search Plugins Settings Documents Help
New Open Save Close Print Undo Redo Cut Copy Paste Find Exit
smb.conf
# This is the main Samba configuration file. You should read the
# smb.conf(5) manual page in order to understand the options listed
# here. Samba has a huge number of configurable options (perhaps too
# many!) most of which are not shown in this example
#
# Any line which starts with a ; (semi-colon) or a # (hash)
# is a comment and is ignored. In this example we will use a #
# for commentry and a ; for parts of the config file that you
# may wish to enable
#
# NOTE: Whenever you modify this file you should run the command "testparm"
# to check that you have not made any basic syntactic errors.
#
#===== Global Settings =====
[global]
# workgroup = NT-Domain-Name or Workgroup-Name
workgroup = wski
# server string is the equivalent of the NT Description field

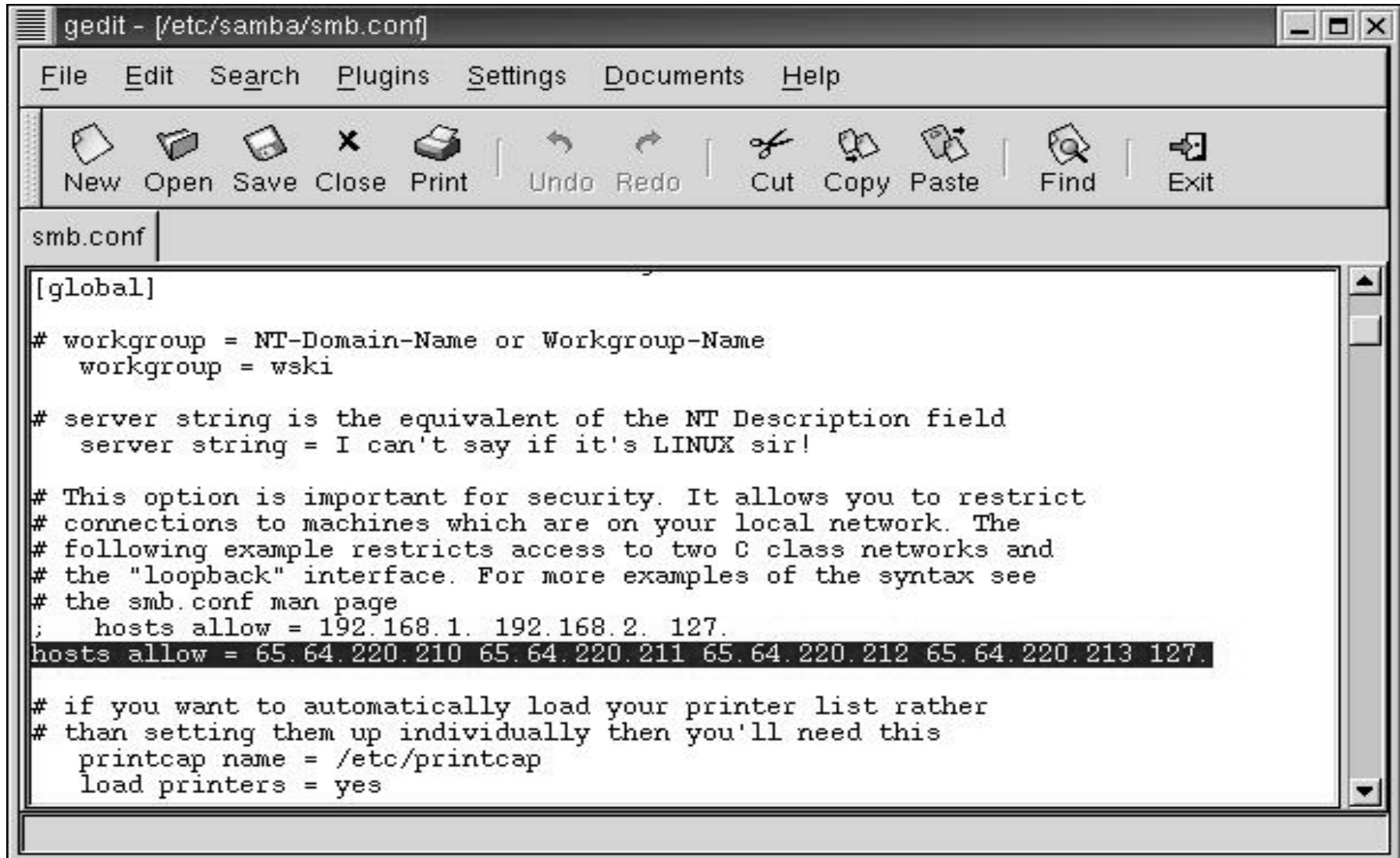
```

Smb.conf (cont)

```

smb.conf
# for commentry and a ; for parts of the config file that you
# may wish to enable
#
# NOTE: Whenever you modify this file you should run the command "testparm"
# to check that you have not made any basic syntactic errors.
#
#----- Global Settings -----
[global]
# workgroup = NT-Domain-Name or Workgroup-Name
  workgroup = wski
# server string is the equivalent of the NT Description field
  server string = I can't say if it's LINUX sir!
# This option is important for security. It allows you to restrict
# connections to machines which are on your local network. The
# following example restricts access to two C class networks and
# the "loopback" interface. For more examples of the syntax see
# the smb.conf man page
  
```

Smb.conf (cont)



```

gedit - [/etc/samba/smb.conf]
File Edit Search Plugins Settings Documents Help
New Open Save Close Print Undo Redo Cut Copy Paste Find Exit
smb.conf
[global]
# workgroup = NT-Domain-Name or Workgroup-Name
  workgroup = wski
# server string is the equivalent of the NT Description field
  server string = I can't say if it's LINUX sir!
# This option is important for security. It allows you to restrict
# connections to machines which are on your local network. The
# following example restricts access to two C class networks and
# the "loopback" interface. For more examples of the syntax see
# the smb.conf man page
;   hosts allow = 192.168.1. 192.168.2. 127.
hosts allow = 65.64.220.210 65.64.220.211 65.64.220.212 65.64.220.213 127.
# if you want to automatically load your printer list rather
# than setting them up individually then you'll need this
  printcap name = /etc/printcap
  load printers = yes

```


Step 5 create/add to the Linux smbpasswd file

```
root@lnxone:/etc/samba
File Edit Settings Help

[root@lnxone samba]# pwd
/etc/samba
[root@lnxone samba]# ls
lmhosts MACHINE.SID secrets.tdb smb.conf smbusers
[root@lnxone samba]# cat lmhosts
127.0.0.1 localhost
65.64.220.210 vmsone
65.64.220.211 wizsmule
65.64.220.213 wintermute
[root@lnxone samba]#
[root@lnxone samba]# cat smbusers
# Unix_name = SMB_name1 SMB_name2 ...
root = administrator admin
nobody = guest pcguest smbguest
johnw = johnw
steves = steves
jennaw = jennaw
smb_pub = smb_pub
[root@lnxone samba]#
[root@lnxone samba]#
[root@lnxone samba]# smbpasswd -a johnw
```

Smbpasswd (cont)

```

root@lnxone:/etc/samba
File Edit Settings Help

[root@lnxone samba]# pwd
/etc/samba
[root@lnxone samba]# ls
lmhosts MACHINE.SID secrets.tdb smb.conf smbusers
[root@lnxone samba]# cat lmhosts
127.0.0.1 localhost
65.64.220.210 vmsone
65.64.220.211 wizsmule
65.64.220.213 wintermute
[root@lnxone samba]#
[root@lnxone samba]# cat smbusers
# Unix_name = SMB_name1 SMB_name2 ...
root = administrator admin
nobody = guest pcguest smbguest
johnw = johnw
steves = steves
jennaw = jennaw
smb_pub = smb_pub
[root@lnxone samba]#
[root@lnxone samba]#
[root@lnxone samba]# smbpasswd -a johnw
New SMB password:

```

smbpasswd (cont)

```

root@lnxone:/etc/samba
File Edit Settings Help

[root@lnxone samba]# pwd
/etc/samba
[root@lnxone samba]# ls
lmhosts MACHINE.SID secrets.tdb smb.conf smbusers
[root@lnxone samba]# cat lmhosts
127.0.0.1 localhost
65.64.220.210 vmsone
65.64.220.211 wizsmule
65.64.220.213 wintermute
[root@lnxone samba]#
[root@lnxone samba]# cat smbusers
# Unix_name = SMB_name1 SMB_name2 ...
root = administrator admin
nobody = guest pcguest smbguest
johnw = johnw
steves = steves
jennaw = jennaw
smb_pub = smb_pub
[root@lnxone samba]#
[root@lnxone samba]#
[root@lnxone samba]# smbpasswd -a johnw
New SMB password:
Retype new SMB password:

```

Smbpasswd (cont)

```

root@lnxone:/etc/samba
File Edit Settings Help
[root@lnxone samba]# ls
lmhosts MACHINE,SID secrets.tdb smb.conf smbusers
[root@lnxone samba]# cat lmhosts
127.0.0.1 localhost
65.64.220.210 vmsone
65.64.220.211 wizsmule
65.64.220.213 wintermute
[root@lnxone samba]#
[root@lnxone samba]# cat smbusers
# Unix_name = SMB_name1 SMB_name2 ...
root = administrator admin
nobody = guest pcguest smbguest
johnw = johnw
steves = steves
jennaw = jennaw
smb_pub = smb_pub
[root@lnxone samba]#
[root@lnxone samba]#
[root@lnxone samba]# smbpasswd -a johnw
New SMB password:
Retype new SMB password:
unable to open passwd database.
Added user johnw.
[root@lnxone samba]# █

```

Step 6 start your daemons and check

```
root@lnxone:/etc/samba
File Edit Settings Help
nobody = guest pcguest smbguest
johnw = johnw
steves = steves
jennaw = jennaw
smb_pub = smb_pub
[root@lnxone samba]#
[root@lnxone samba]#
[root@lnxone samba]# smbpasswd -a johnw
New SMB password:
Retype new SMB password:
unable to open passwd database.
Added user johnw.
[root@lnxone samba]#
[root@lnxone samba]#
[root@lnxone samba]# smbdc
[root@lnxone samba]# nmbd
[root@lnxone samba]#
[root@lnxone samba]# ps -ef | grep smb
root      1011      1   0 19:10 ?        00:00:00 smbdc -D
root      3118    2597   0 20:03 pts/0    00:00:00 grep  smb
[root@lnxone samba]# ps -ef | grep nmb
root      1016      1   0 19:10 ?        00:00:00 nmbd -D
root      3120    2597   0 20:03 pts/0    00:00:00 grep  nmb
[root@lnxone samba]#
```

OpenVMS Samba and Advanced Server



- Samba does run on OpenVMS and it's Free
- Advanced Server runs on OpenVMS and it Costs.
- What do I look like I was born yesterday?

OpenVMS Advanced Server

- Advanced Server Source Code is sold/bartered/aquired by legal contract between Microsoft and HP/OpenVMS engineering.
- OpenVMS engineering builds, tests, and integrates Advanced Server with the goal of FULL compatibility with the Windows Servers.
- It's fully supported from Colorado and VMS engineering
- It does cost money for the license fee.
- Advanced Server is not part of the OpenVMS Hobbyist Program – Perhaps you should ask?

Top 7 Reasons (abridged) to chose OpenVMS Advanced Server over Samba



- AS is commercial software with full support from HP
- AS is updated regularly, SAMBA on VMS is updated...
Less so
- AS can participate in an NT 4.0 or Windows 2000 security domain (Samba is looking for Win2k support soon)
- AS can be a Primary Domain Controller, Backup Domain Controller or a member server in the new security domain for Windows
- AS is licensed like the MS Windows Advanced Server products (oh wait that's another reason to use SAMBA)
- AS and Samba means never having to say you are sorry to Bill again.

Summary Advanced Server vs Samba



- Both have File and Print Service
- Both can sync passwords and home directories with multiple OS clients
- Both can be a Master Browser
- Both can provide WINS support
- Advanced Server fully integrates with the OpenVMS registry and integrates fully into all MS security domains
- SAMBA is free under licenses from GNU

- Go forth and share disks and printers...

But John, What about some Network Stuff?



TCP/IP between Linux and OpenVMS

- Both VMS and Linux support the TCP/IP standard interfaces for process / application communications.
- Telnet, FTP, Xwindows, RSH, REXEC
- USE of Known Ports
- These give great flexibility.. There is also almost no privacy.
- Repeat the mantra: Crypto, Crypto, and then Encryption...

TCP/IP Security Tools

- OpenSSL for OpenVMS

<http://www.openvms.compaq.com>

- OpenSSL for Linux Standard with RedHat Distribution
or <http://www.openssl.org/>

- Stunnel for OpenVMS 7.3-1 Open Source CDrom

- Stunnel for Linux <http://www.stunnel.org/>

- OpenVMS SSH Process Software or OpenVMS Early Adopter Kit available this Fall.

- SSH for Linux is available with the RedHat Distribution.

Installing SSL and Stunnel on OpenVMS

```
root@Inxone:~
File Edit Settings Help
The following product has been selected:
  CPQ AXPVMS SSL V1.0-A                Layered Product [Installed]
Do you want to continue? [YES] yes
Configuration phase starting ...
You will be asked to choose options, if any, for each selected product and for
any products that may be installed to satisfy software dependency requirements.
CPQ AXPVMS SSL V1.0-A: SSL for OpenVMS Alpha V1.0-A (Based on OpenSSL 0.9.6B).
  (c) Compaq Computer Corporation 2002. All rights reserved.
Do you want the defaults for all options? [YES] yes
Do you want to review the options? [NO]
Execution phase starting ...
The following product will be installed to destination:
  CPQ AXPVMS SSL V1.0-A                DISK$VMS0731:[VMS$COMMON,]
Portion done: 0%...10%...20%...30%█
```

SSL Installation (cont)

```

root@Inxone:~
File Edit Settings Help
Partition done: 0%...10%...20%...30%...40%...50%...60%...70%...80%...90%...100%
The following product has been installed:
  CPQ AXPVMS SSL V1.0-A          Layered Product
%PCSI-I-IVPEXECUTE, executing test procedure for CPQ AXPVMS SSL V1.0-A ...
%PCSI-I-IVPSUCCESS, test procedure completed successfully

CPQ AXPVMS SSL V1.0-A: SSL for OpenVMS Alpha V1.0-A (Based on OpenSSL 0.9.6B).

  Insert the following lines in SYS$MANAGER:SYSTARTUP_VMS.COM:
    @sys$startup:ssl$startup.com
  Insert the following lines in SYS$MANAGER:SYSHUTDOWN.COM:
    @sys$startup:ssl$shutdown.com

  There are post installation activities that need to be performed.

  This includes things like defining logical names and running SSL$UTILS.COM
  to define some foreign symbols, and running the IVP if it was not done
  as part of the installation. Refer to the Release Notes for more
  information about activities that should be performed once the installation
  has finished.

  SSL has created the following directory structure in
  
```

SSL Intallation (cont)

```

root@Inxone:~
File Edit Settings Help
to define some foreign symbols, and running the IVP if it was not done
as part of the installation. Refer to the Release Notes for more
information about activities that should be performed once the installation
has finished.

SSL has created the following directory structure in
PCSI$DESTINATION, which defaults to SYS$SYSDEVICE:[VMS$COMMON]:

[SSL] - Top-level SSL directory
[SSL.ALPHA_EXE] - Contains the images for the Alpha platform.
[SSL.COM] - Directory to hold the various command procedures.
[SSL.DEMOCA] - Directory structure to demo SSL's CA features
[SSL.DEMOCA.CERTS] - Directory to hold the certificates and keys
[SSL.DEMOCA.CONF] - Contains the configuration files.
[SSL.DEMOCA.CRL] - Contains revoked certificates and CRLs
[SSL.DEMOCA.PRIVATE] - Directory for private keys and random data.
[SSL.INCLUDE] - Contains the C Header (.H) files.
[SSL.TEST] - Contains the files used during the IVP.

Refer to SYS$HELP:SSL010A.RELEASE_NOTES for more information.

@SYS$STARTUP:SSL$STARTUP.COM should be run at system startup.
$ █

```

SSL Installation completed

```

root@lnxone:~
File Edit Settings Help

$ show logical/system ssl*

(LNM$SYSTEM_TABLE)

"SSL$CERTS" = "SSL$ROOT:[DEMOCA.CERTS]"
"SSL$COM" = "SSL$ROOT:[COM]"
"SSL$CONF" = "SSL$ROOT:[DEMOCA.CONF]"
"SSL$CRL" = "SSL$ROOT:[DEMOCA.CRL]"
"SSL$EXE" = "SSL$ROOT:[ALPHA_EXE]"
"SSL$INCLUDE" = "SSL$ROOT:[INCLUDE]"
"SSL$KEY" = "SSL$ROOT:[DEMOCA.CERTS]"
"SSL$PRIVATE" = "SSL$ROOT:[DEMOCA.PRIVATE]"
"SSL$ROOT" = "VMSONE$DKC600:[SYS0,SYSCOMMON,SSL,]"

(LNM$SYSCLUSTER_TABLE)
$
$
$
$
$
$
$
$
$
$
$

```


Edit systartup_vms.com file for SSL

```
root@lnxone:~
File Edit Settings Help
$!
$!
$! Remove the comment delimiter ($!) from the following line to have
$! Monitor run with TCP/IP.
$!
$ @SYS$STARTUP:VPM$STARTUP.COM
$!
$!
$! Remove the comment delimiter ($!) from the following line to start
$! RPC services.
$!
$ $ @SYS$STARTUP:DCE$RPC_STARTUP.COM
$!
$! -----
$!          OpenSSL Startup...
$! -----
$!
$@sys$startup:ssl$startup.com
$!
$ EXIT
[End of file]
Buffer: SYSTARTUP_VMS.COM | Write | Insert | Forward
424 lines read from file SYS$COMMON:[SYSMGR]SYSTARTUP_VMS.COM;3
```


Start the SSL certificate tool

```

root@Inxone:~
File Edit Settings Help
$
$
$
$
$
$
$ create/dir ssl$root:[stunnel]
$ dir

Directory SYS$SYSDEVICE:[TEMP]

CPQ-AXPVMS-SSL-V0100-A-1.PCSI;1          README.TXT;1          README_VMS.TXT;1
SMILEY_JRW_STUNNEL_082302.TXT;1        STUNNEL-3_22.BCK;1

Total of 5 files.
$ backup stunnel-3_22.bck/save ssl$root:[stunnel...]*.*
$ set def ssl$root:[com]
$ dir ssl$cert_tool.com

Directory SSL$ROOT:[COM]

SSL$CERT_TOOL.COM;1

Total of 1 file.
$ @ssl$cert_tool.com

```

From the SSL menu chose 5

```
root@Inxone:~  
File Edit Settings Help  
SSL Certificate Tool!  
Main Menu  
1. View a Certificate  
2. View a Certificate Signing Request  
3. Create a Certificate Signing Request  
4. Create a Self-Signed Certificate  
5. Create a CA (Certification Authority) Certificate  
6. Sign a Certificate Signing Request  
7. Hash Certificates  
8. Hash Certificate Revocations  
9. Exit  
Enter Option: █
```

Enter Answers to Create CA

```
root@Inxone:~  
File Edit Settings Help  
SSL Certificate Tool  
Create Certification Authority  
PEM Pass Phrase ? []  
Confirm PEM Pass Phrase ? []  
Encryption Bits ? [1024]  
Default Days ? [1825]  
CA certificate Key File ? [SSL$ROOT:[DEMOCA,CERTS]SERVER_CA.KEY]  
CA certificate File ? [SSL$ROOT:[DEMOCA,CERTS]SERVER_CA.CRT]  
Country Name ? [US]  
Organization Name ? [Defcon-vms]  
Organization Unit Name ? [] dfwlug  
Common Name ? [CA Authority]  
Display the CA certificate ? [N] █
```

Next chose Create Cert Request

```
root@Inxone:~  
File Edit Settings Help  
SSL Certificate Tool!  
Create Certificate Request  
Encrypt Private Key ? [N]  
Encryption Bits ? [1024]  
Certificate Key File ? [SSL$ROOT:[DEMOCA.CERTS]SERVER.KEY]  
Certificate Request File ? [SSL$ROOT:[DEMOCA.CERTS]SERVER.CSR]  
Country Name ? [US]  
State or Province Name ? [texas]  
City Name ? [mesquite]  
Organization Name ? [defcon-vms]  
Organization Unit Name ? [] dfwlug  
Common Name ? [vmsone.vmsone.com]  
Email Address ? [system@vmsone.vmsone.com]  
Display the Certificate ? [N] █
```

Last Sign the Certificate

```
root@Inxone:~  
File Edit Settings Help  
SSL Certificate Tool!  
Main Menu  
1. View a Certificate  
2. View a Certificate Signing Request  
3. Create a Certificate Signing Request  
4. Create a Self-Signed Certificate  
5. Create a CA (Certification Authority) Certificate  
6. Sign a Certificate Signing Request  
7. Hash Certificates  
8. Hash Certificate Revocations  
9. Exit  
Enter Option: 6
```

```
root@Inxone:~  
File Edit Settings Help  
SSL Certificate Tool  
Sign Certificate Request  
CA Certificate File ? [SSL$ROOT:[DEMOCA.CERTS]SERVER_CA.CRT]  
CA Certificate Key File ? [SSL$ROOT:[DEMOCA.CERTS]SERVER_CA.KEY]  
Certificate Request File ? [SSL$CSR:SERVER.CSR]  
Signed Certificate File ? [SSL$CRT:SIGNED.CRT]  
Default Days ? [365]  
PEM Pass Phrase ? []  
Display the Certificate ? [N] █
```


SSL Certificate Finished!

```
root@Inxone:~  
File Edit Settings Help  
SSL Certificate Tool!  
Main Menu  
1. View a Certificate  
2. View a Certificate Signing Request  
3. Create a Certificate Signing Request  
4. Create a Self-Signed Certificate  
5. Create a CA (Certification Authority) Certificate  
6. Sign a Certificate Signing Request  
7. Hash Certificates  
8. Hash Certificate Revocations  
9. Exit  
Enter Option: 9
```

Now let's configure the Stunnel software

```
root@Inxone:~  
File Edit Settings Help  
$  
$  
$  
$  
$  
$  
$  
$  
$  
$  
$  
$  
$  
$  
$  
$  
$  
$  
$  
$  
$  
$ set def ssl$root:[stunnel]  
$ dir  
  
Directory SSL$ROOT:[STUNNEL]  
  
STUNNEL-3_22.DIR;1 STUNNEL.PEM;1  
  
Total of 2 files.  
$ █
```


View Stunnel PEM file

```

root@lnxone:~
File Edit Settings Help
-----BEGIN CERTIFICATE-----
MIICCCCAxGgAwIBAgIBADANBgkqhkiG9w0BAQQFADBKMQswCQYDVQQGEwJVUzET
MBEGA1UECHMKRGVmY29uLXZtczEVMGMGA1UEAxMMQ0EgQXV0aG9yaXR5MQ8wDQYD
VQQLEwZkZndsdWcwHhcNMDIwODIzMDAzNzE4WWhcNMDcwODIzMDAzNzE4WjBKMQsw
CQYDVQQGEwJVUzETMBEGA1UECHMKRGVmY29uLXZtczEVMGMGA1UEAxMMQ0EgQXV0
aG9yaXR5MQ8wDQYDVQQLEwZkZndsdWcwZ8wDQYJKoZIhvcNAQEBBQADgY0AMIGJ
AaGBALoF0hpiFmufP55xaaZMKhORzb/F2UVM5SF0BvMxETGDWDvykWoUnw27+F1
kHvZLD/KVuIQaHkQCXN5ws6IiRU5jFJA0++C8fPJndP7NuJy6ky21kBS8KNARjm
xntx91gYvM5fidkuguNgifpaQepOwcgSdtjLflxvXDVjCd4VAgMBAAEwDQYJKoZI
hvcNAQEEBQADgYEAPdUDf/kg19p/UXEbGVnocC0B58tJ4Fyc71JwTMeX3XQse3ZF
Iy0sareyXQ7AipBkDuW4BqQCCYsoR52+DMzjAnOPHDx6Eq7XzPOYWR1ZqkeVPJNS
kYi1aq2MTox+fTVtWzfrTsScBzE3MAKVqgrtOp8fdj8WMP10BoTYhQANDYs=
-----END CERTIFICATE-----
-----BEGIN RSA PRIVATE KEY-----
Proc-Type: 4,ENCRYPTED
DEK-Info: DES-EDE3-CBC,09A219EA35377EB4

x8Tq+DghdFD+HFbiBKUpYGq4wnZIqpQgZjQqtoTvhcOutT1QLrh0TBQz/duS6OpU
k1TOK4gqdsR6jvth+GVx0aucqNaLS1+MMIbHJ4KprkATHomuEyduppyUOS7kbDiSN
5Bzasw4M8o5AaInc45sIDA0SiZDpG5kKtiV48eQ5HbGqydlg09f1UkvaLSJd7Kx1
QjufYciI9X3/mhPqp1NoIwzmV/xzBBxv4hy1v4N6J9kuxusNgDehoYazy5Fe7KDR
/41oZgnkKZiKWUclFyt21up+tcAeI9df1YFnBP1sHDKpQJocWirQ0hPe4Q9FOnKq
0cJPKQIZtW3EjyphiwF/hAR9Kw2BoGdzW115A5LVipM+zSKWh8azQh8cJoYvokqg
Press RETURN to continue

```

Copy Stunnel_startup_server.com

```
root@Inxone:~  
File Edit Settings Help  
$  
$  
$  
$  
$ set def ssl$root:[stunnel]  
$ dir  
  
Directory SSL$ROOT:[STUNNEL]  
  
STUNNEL-3_22.DIR;1 STUNNEL.PEM;1  
  
Total of 2 files.  
$ copy ssl$root:[stunnel,stunnel-3_22,vms]stunnel.exe ssl$root:[stunnel]*.*  
$ copy ssl$root:[stunnel,stunnel-3_22,vms]stunnel_startup_server.com ssl$root:[stunnel]*.*  
$ dir  
  
Directory SSL$ROOT:[STUNNEL]  
  
STUNNEL-3_22.DIR;1 STUNNEL.EXE;1 STUNNEL.PEM;1  
STUNNEL_STARTUP_SERVER.COM;1  
  
Total of 4 files.  
$ █
```

Edit the startup file for your system

```
root@Inxone:~
File Edit Settings Help
$! Edit this command procedure file to run Stunnel in your environment
$!
$! AUTHOR: Taka Shinagawa, OpenVMS Security
$!       (takaaki.shinagawa@hp.com)
$! DATE: June 2, 2002
$! #####
$! Define a Stunnel command /* Edit this for your Stunnel command */
$! Telnet
$! stunnel_command = "STUNNEL -d 992 -r localhost:23 -p [-]stunnel.pem -o stunn
$ stunnel_command="stunnel -d 992 -r localhost:23 -p -
ssl$root:[stunnel]stunnel.pem -o stunnel.log"
$! -----
$! Ask if the private-key is encrypted
$question:
$ inquire encrypted "Is the private key (in the PEM file) encrypted? [Y/N]"
$ if encrypted .eqs. ""
$ then
$     goto question
$ else
$     if encrypted .eqs. "Y" then goto encrypted
```


Startup the Stunnel Server

```

root@Inxone:~
File Edit Settings Help
$
$
$
$
$
$
$
$
$
$
$ dir

Directory SSL$ROOT:[STUNNEL]

STUNNEL-3_22.DIR;1  STUNNEL.EXE;1          STUNNEL.PEM;1
STUNNEL_STARTUP_SERVER.COM;2          STUNNEL_STARTUP_SERVER.COM;1

Total of 5 files.
$ @stunnel_startup_server
Is the private key (in the PEM file) encrypted? [Y/N]: y
Enter the password to decrypt the key (please use paired double quotes with it):
"welcome1"
Starting up a Stunnel running at port 992
%RUN-S-PROC_ID, identification of created process is 20200435
Stunnel was successfully started up!
$ █

```


Check to see if the process is running

```
root@Inxone:~  
File Edit Settings Help  
$  
$  
$  
$  
$  
$  
$  
$  
$  
$  
$  
$  
$ @stunnel_startup_server  
Is the private key (in the PEM file) encrypted? [Y/N]: y  
Enter the password to decrypt the key (please use paired double quotes with it):  
"welcome1"  
Starting up a Stunnel running at port 992  
%RUN-S-PROC_ID, identification of created process is 20200437  
Stunnel was successfully started up!  
$ show system/process=stunnel992  
OpenVMS V7.3-1 on node VMSONE 26-AUG-2002 20:16:53.37 Uptime 0 01:51:06  
Pid Process Name State Pri I/O CPU Page flts Pages  
20200437 STUNNEL992 LEF 5 659 0 00:00:00.19 368 481  
$
```


Linux Stunnel Install Directory

```
root@lnxone:~/Stunnel/stunnel-3.22
File Edit Settings Help
stunnel-3.22/Makefile.in
stunnel-3.22/Makefile.w32
stunnel-3.22/mkinstalldirs
stunnel-3.22/PORTS
stunnel-3.22/README
stunnel-3.22/configure.ac
stunnel-3.22/pty.c
stunnel-3.22/stunnel.8
stunnel-3.22/stunnel.exe
stunnel-3.22/options.c
stunnel-3.22/client.c
stunnel-3.22/client.h
stunnel-3.22/doc/
stunnel-3.22/doc/polish/
stunnel-3.22/doc/polish/faq.stunnel-2.html
stunnel-3.22/doc/polish/tworzenie_certyfikatow.html
stunnel-3.22/doc/english/
stunnel-3.22/doc/english/transproxy.txt
stunnel-3.22/doc/english/VNC_StunnelHOWTO.html
stunnel-3.22/doc/rfc2246.txt
stunnel-3.22/CREDITS
stunnel-3.22/prototypes.h
[root@lnxone Stunnel]# cd stunnel-3.22
[root@lnxone stunnel-3.22]#
```

Linux Stunnel ./configure

```

root@lnxone:~/Stunnel/stunnel-3.22
File Edit Settings Help
[root@lnxone stunnel-3.22]#
[root@lnxone stunnel-3.22]#
[root@lnxone stunnel-3.22]# ./configure
checking build system type... i586-pc-linux-gnu
checking host system type... i586-pc-linux-gnu
checking for gcc... gcc
checking for C compiler default output... a.out
checking whether the C compiler works... yes
checking whether we are cross compiling... no
checking for executable suffix...
checking for object suffix... o
checking whether we are using the GNU C compiler... yes
checking whether gcc accepts -g... yes
checking for a BSD compatible install... /usr/bin/install -c
checking whether make sets ${MAKE}... yes
checking for SSL directory... /usr
checking for "/dev/urandom"... yes
checking whether to enable SSL certificate defaults... no
checking whether to disable RSA support... no
checking whether to enable DH support... no
checking for dlopen in -ldl... yes
checking for gethostbyname in -lnsl... yes
checking for socket in -lsocket... no
checking for pthread_create in -lpthread... █

```

Linux Stunnel make

```

root@lnxone:~/Stunnel/stunnel-3.22
File Edit Settings Help
checking for unsigned long long... yes
checking size of unsigned long long... 8
configure: creating ./config.status
config.status: creating Makefile
[root@lnxone stunnel-3.22]#
[root@lnxone stunnel-3.22]#
[root@lnxone stunnel-3.22]#
[root@lnxone stunnel-3.22]#
[root@lnxone stunnel-3.22]#
[root@lnxone stunnel-3.22]# make
gcc -g -O2 -Wall -I/usr/include -DVERSION=\"3.22\" -DHAVE_OPENSSL=1 -Dssldir=\"/usr\" -DPEM_DIR=\"\" -DRANDOM_FILE=\"/dev/urandom\" -DNO_DH=1 -DHOST=\"i586-pc-linux-gnu\" -DHAVE_LIBDL=1 -DHAVE_LIBNSL=1 -DHAVE_LIBPTHREAD=1 -DHAVE_LIBUTIL=1 -DHAVE_LIBWRAP=1 -DHAVE_DEV_PTMX=1 -DHAVE_GETOPT_H=1 -DHAVE_UNISTD_H=1 -DHAVE_SYS_SELECT_H=1 -DHAVE_TCPD_H=1 -DHAVE_PTHREAD_H=1 -DHAVE_SYS_IOCTL_H=1 -DHAVE_PTY_H=1 -DHAVE_STROPTS_H=1 -DHAVE_SYS_RESOURCE_H=1 -DHAVE_GETOPT=1 -DHAVE_SNPRINTF=1 -DHAVE_VSNPRINTF=1 -DHAVE_OPENPTY=1 -DHAVE_DAEMON=1 -DHAVE_WAITPID=1 -DHAVE_WAIT4=1 -DHAVE_SYSCONF=1 -DHAVE_GETRLIMIT=1 -DHAVE_PTHREAD_SIGMASK=1 -DSTDC_HEADERS=1 -DHAVE_SYS_TYPES_H=1 -DHAVE_SYS_STAT_H=1 -DHAVE_STDLIB_H=1 -DHAVE_STRING_H=1 -DHAVE_MEMORY_H=1 -DHAVE_STRINGS_H=1 -DHAVE_INTTYPES_H=1 -DHAVE_STDINT_H=1 -DHAVE_UNISTD_H=1 -DSIZEOF_UNSIGNED_CHAR=1 -DSIZEOF_UNSIGNED_SHORT=2 -DSIZEOF_UNSIGNED_INT=4 -DSIZEOF_UNSIGNED_LONG=4 -DSIZEOF_UNSIGNED_LONG_LONG=8 -Dlibdir=\"/usr/local/lib\" -DPIDDIR=\"/usr/local/var/stunnel/\" -c -o client.o client.c

```

Stunnel Make Questions for CA

```
root@lnxone:~/Stunnel/stunnel-3.22
File Edit Settings Help
You are about to be asked to enter information that will be incorporated
into your certificate request.
What you are about to enter is what is called a Distinguished Name or a DN.
There are quite a few fields but you can leave some blank
For some fields there will be a default value,
If you enter '.', the field will be left blank.
-----
Country Name (2 letter code) [PL]:US
State or Province Name (full name) [Some-State]:Texas
Locality Name (eg, city) []:Mesquite
Organization Name (eg, company) [Stunnel Developers Ltd]:Defcon-VMS
Organizational Unit Name (eg, section) []:dfwlug
Common Name (FQDN of your server) [localhost]:
test 1 -eq 1 || test ! -f "/dev/urandom" || \
    /usr/bin/openssl gen dh -rand "/dev/urandom" 512 >> stunnel.pem
test 1 -eq 1 || test -f "/dev/urandom" || \
    /usr/bin/openssl gen dh 512 >> stunnel.pem
/usr/bin/openssl x509 -subject -dates -fingerprint -noout \
    -in stunnel.pem
subject= /C=US/ST=Texas/L=Mesquite/O=Defcon-VMS/OU=dfwlug/CN=localhost
notBefore=Aug 27 01:51:24 2002 GMT
notAfter=Aug 27 01:51:24 2003 GMT
MD5 Fingerprint=FE:19:F1:91:67:9A:C5:7E:AD:32:12:60:0F:54:42:E6
[root@lnxone stunnel-3.22]#
```

Using the Linux Stunnel Client

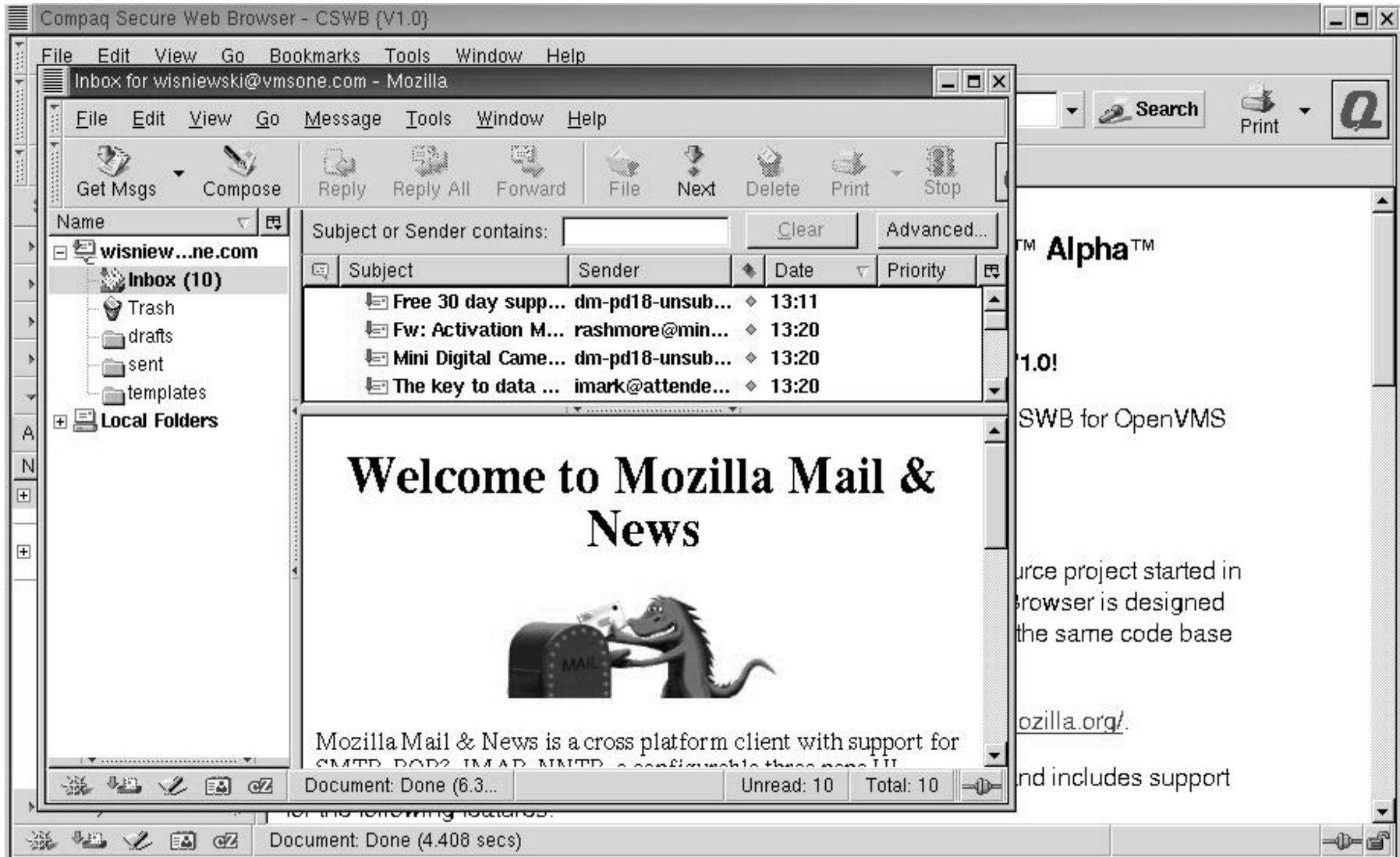
```
root@lnxone:~/Stunnel/stunnel-3.22
File Edit Settings Help
[root@lnxone stunnel-3.22]#
[root@lnxone stunnel-3.22]#
[root@lnxone stunnel-3.22]#
[root@lnxone stunnel-3.22]#
[root@lnxone stunnel-3.22]# stunnel -c -d 992 -r vmsone.com:992 -o stunnel_client.log
[root@lnxone stunnel-3.22]# telnet localhost 992
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.

Welcome to OpenVMS (TM) Alpha Operating System, Version V7.3-1

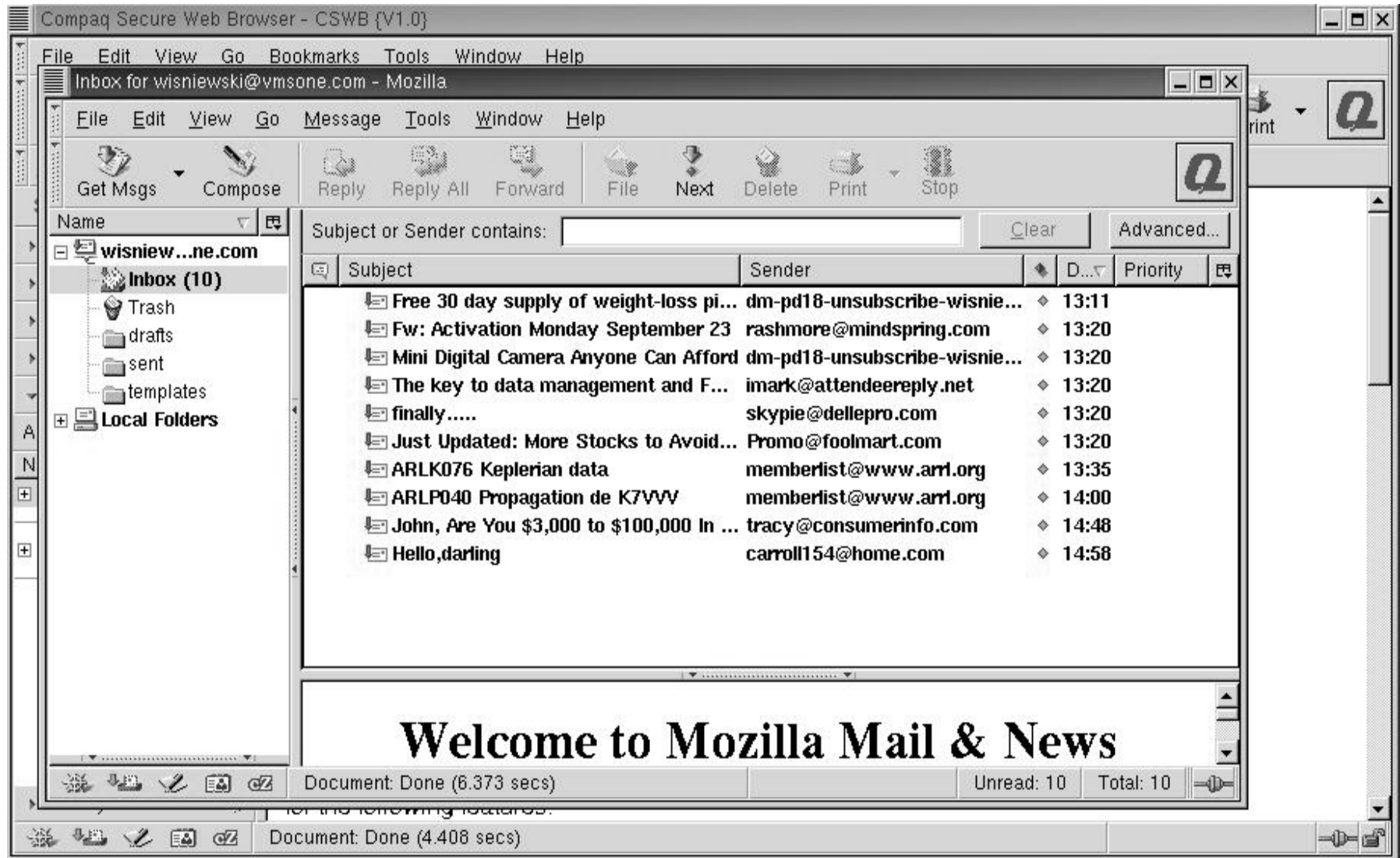
Username: system
Password:
User authorization failure
Username: system
Password:
Welcome to OpenVMS (TM) Alpha Operating System, Version V7.3-1
Last interactive login on Monday, 26-AUG-2002 20:20:16.10
Last non-interactive login on Monday, 26-AUG-2002 18:27:47.63
1 failure since last successful login

$ █
```

E-mail clients for OpenVMS and Linux



Mozilla is Mozilla for VMS or Linux



In Conclusion

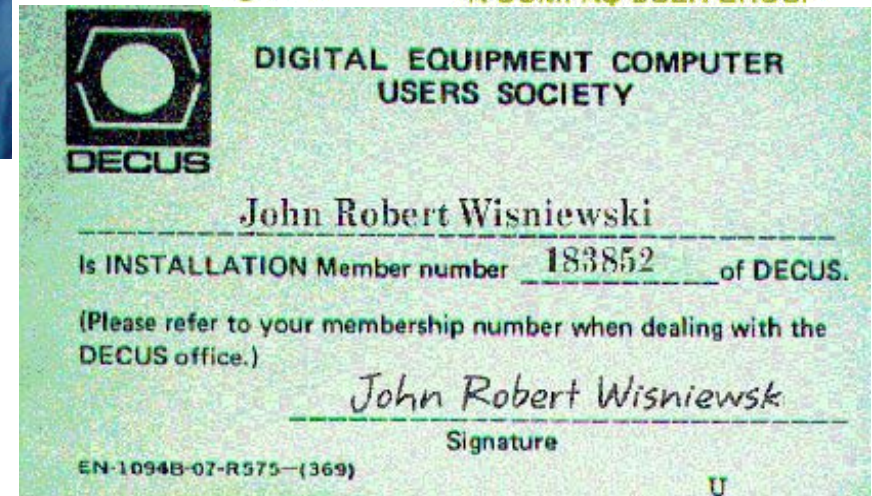
- Linux is way cool!
- OpenVMS is way cool!
- They both share disks, graphics, do crypto together, share e-mail, and emulate the best parts of windows systems.
- At least at my house....
- And at many other houses too I'm sure.
- Use this information for good and not evil and if you must use force, clean up after yourself when finished...

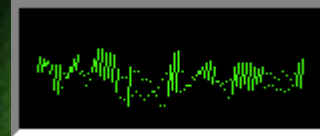
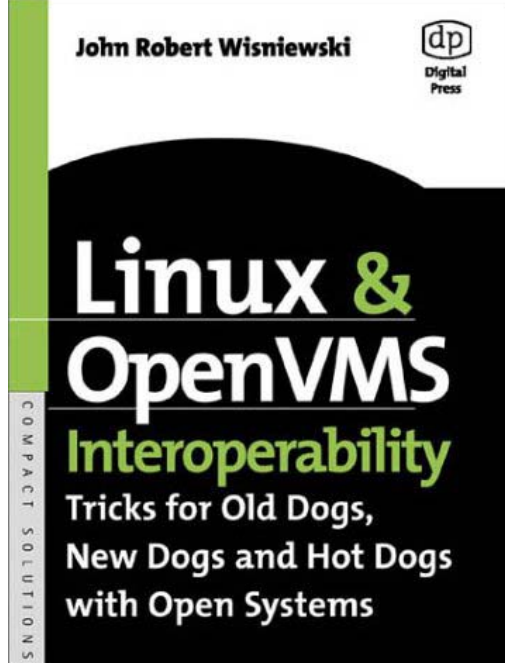
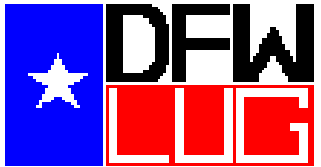


The Flag Motherhood, and Apple Pie And OpenVMS Hobbyist Programs

<http://vmsone.com>

<http://openvmshobbyist.org>

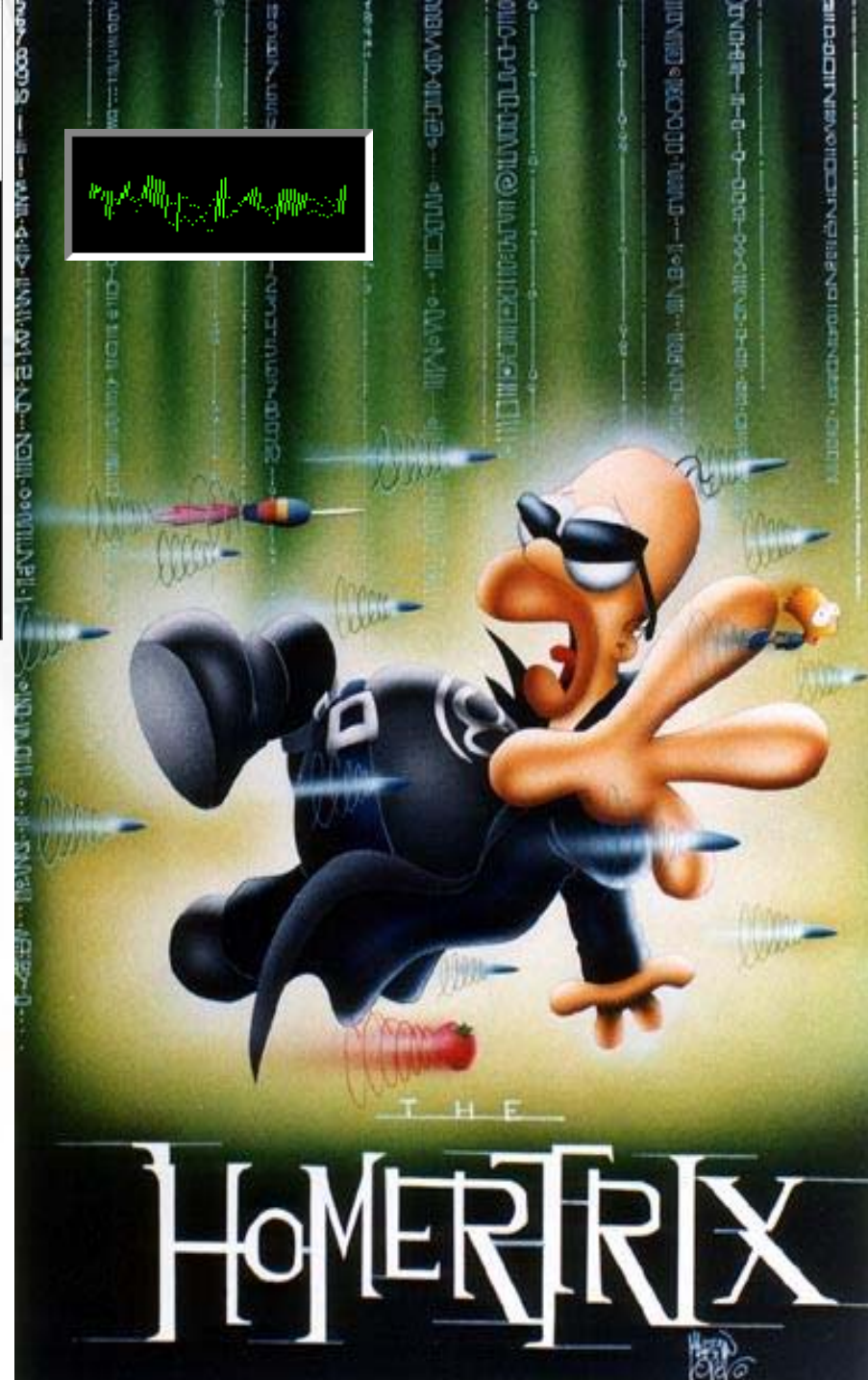




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i n v e n t



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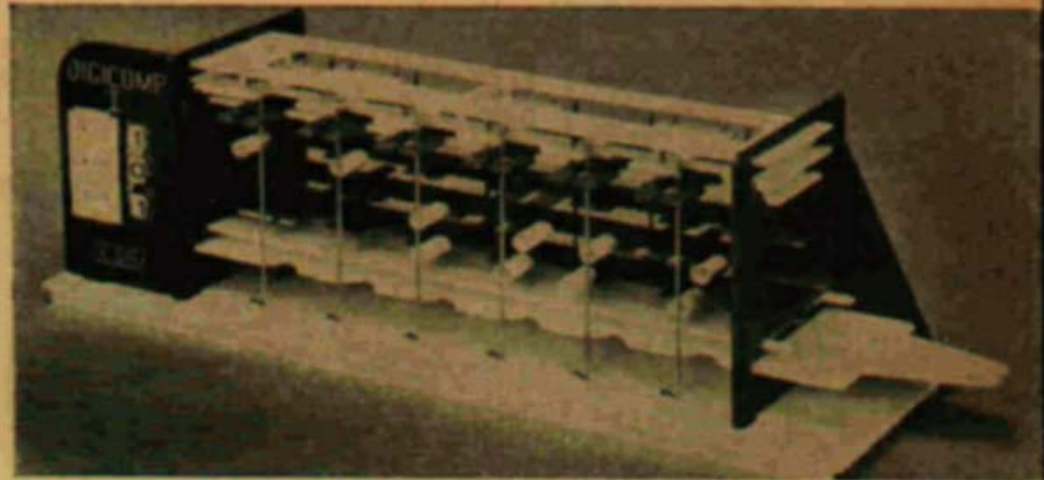
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