

Sistemas Operativos I

Taller 5: Caso de estudio del sistema operativo Unix System V, Release 4

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1 OBJETIVOS

- Evolución
- Realizar el proceso de instalación del sistema operativo
- Identificar el manejo de Archivos, Shell
- Estructura del Sistema Operativo
- Clasificación del Sistema Operativo
- Ejecución de Comandos, al menos 25.

2 EVOLUCIÓN DE UNIX

System V Unix ó Unix System V, comúnmente abreviado ***Sys V*** y rara vez se llama Sistema de Mayo, fue una de las versiones del sistema operativo Unix. Fue desarrollado originalmente por AT & T y lanzó por primera vez en 1983. Cuatro versiones del Sistema V fueron puestos en libertad, calificó los módulos 1, 2, 3 y 4 como las versiones más exitosas. La fuente de Unix posee varias características comunes, tales como los *Sys V init scripts* (**/etc/init.d**), que se usan para controlar el sistema de arranque y cierre de todos los servicios.

El sistema también constituye la base de la definición de interfaz System V (SVID), un estándar de la definición de la forma en que el sistema V tienen acuerdos de trabajo. El otro de los dos principales ramas del sistema Unix es Berkeley Software Distribution. Mientras que AT & T vendió su propio hardware que se desarrolló del Sistema V (véase el AT & T en Informática de Sistemas), la mayoría de los clientes corrió una versión de un distribuidor, sobre la base de AT & T de referencia de aplicación. Según también el artículo presentado en Wikipedia¹ Esta liberación 4 tenía varias características y mejoras importantes entre ellas :

- Soporte TCP/IP, sockets, UFS, soporte para múltiples grupos, shell escrita en C, todo ella obtenida de BSD.
- Implementación de una interfaz para el sistema de archivos virtual, Soporte de NFS.
- Mejora de compatibilidad para utilización de librerías compartidas en el sistemas.
- Implementación de OpenWindows Gui para entornos gráficos.
- Soporte multilinguaje gracias al paquete MNLS.
- Soporte para el estándar POSIX y X/Open.

Para realizar el proceso de instalación de SysVR4 lo que se hizo fue seguir el tutorial provisto del profesor, en este tutorial se explica en detalle como realizar la instalación del sistema operativo base, sus componentes y paquetes externos y drivers para el sistema. Desafortunadamente, el sistema no explica como realizar la instalación del sistema gráfico.

1. https://en.wikipedia.org/wiki/UNIX_System_V

3 PROCESO DE INSTALACIÓN UNIX SYSTEM V R4

```
total real memory      = 33157120
total available memory = 31412224

AT&T UNIX System V/386 Release 4.0 Version 2.1

Copyright (c) 1984, 1986, 1987, 1988, 1989, 1990 AT&T
Copyright (c) 1987, 1988 Microsoft Corp.
All Rights Reserved

Ram Disk Driver, Copyright (c) 1986, 1987, 1988, 1989 Intel Corp.
RAM Disk 0 Allocated: size= 1185Kb
RAM Disk 1 Allocated: size= 512Kb

Portions Copyright (C) 1990 Intel Corporation.
All Rights Reserved

Please insert the UNIX System "Base System Package"
Floppy Disk 2 and then strike ENTER._
```

(a) Bienvenida Instalador Unix System V R4

```
total available memory = 31412224
AT&T UNIX System V/386 Release 4.0 Version 2.1

Copyright (c) 1984, 1986, 1987, 1988, 1989, 1990 AT&T
Copyright (c) 1987, 1988 Microsoft Corp.
All Rights Reserved

Ram Disk Driver, Copyright (c) 1986, 1987, 1988, 1989 Intel Corp.
RAM Disk 0 Allocated: size= 1185Kb
RAM Disk 1 Allocated: size= 512Kb

Portions Copyright (C) 1990 Intel Corporation.
All Rights Reserved

Please insert the UNIX System "Base System Package"
Floppy Disk 2 and then strike ENTER.

Please strike ENTER to install the UNIX System
on your hard disk or DEL to cancel the installation.

WARNING: A new installation of the UNIX System will destroy
all files currently on the system. Do you wish to continue (y or n)? y_
```

(b) Aceptando terminos de instalacion de Unix

```
All Rights Reserved

Please insert the UNIX System "Base System Package"
Floppy Disk 2 and then strike ENTER.

Please strike ENTER to install the UNIX System
on your hard disk or DEL to cancel the installation.

WARNING: A new installation of the UNIX System will destroy
all files currently on the system. Do you wish to continue (y or n)? y

If you wish to use part of your hard disk for
other operating system(s) other than the UNIX System,
such as MS-DOS, that space MUST be reserved now.
You are about to partition hard disk 0.
Please strike ENTER when ready or DEL to cancel the installation.
The recommended default partitioning for your disk is:

a 100% "UNIX System" partition.

To select this, please type "y". To partition your disk
differently, type "n" and the "fdisk" program will let you
select other partitions._
```

(c) Utilizaremos 100% del disco para la instalacion.

```
other operating system(s) other than the UNIX System,
such as MS-DOS, that space MUST be reserved now.
You are about to partition hard disk 0.
Please strike ENTER when ready or DEL to cancel the installation.
The recommended default partitioning for your disk is:

a 100% "UNIX System" partition.

To select this, please type "y". To partition your disk
differently, type "n" and the "fdisk" program will let you
select other partitions. y

Hard disk partitioning complete.
The following hard disk elements are required and
must reside on your primary (disk 0) hard disk:

Drive Name Type File System/Slice
-----
0 Boot File System bfs /stand
0 Swap Slice - /dev/swap
0 Root File System ufs, s5 /

Please select the File System Type for / (Root File System ) from
the following list:

ufs, s5

Please press ENTER for the default type, ufs._
```

(d) Seleccion del Sistema de Archivos para la Instalacion ufs

```
The following hard disk elements are required and
must reside on your primary (disk 0) hard disk:

Drive Name Type File System/Slice
-----
0 Boot File System bfs /stand
0 Swap Slice - /dev/swap
0 Root File System ufs, s5 /

Please select the File System Type for / (Root File System ) from
the following list:

ufs, s5

Please press ENTER for the default type, ufs.

Do you wish to create any optional
disk slices or filesystems (y or n)? n

The Hard disk layout you have selected is:

Drive Name Type File System/Slice
-----
0 Boot File System bfs /stand
0 Swap Slice - /dev/swap
0 Root File System ufs /

Is this correct (y or n)? _
```

(e) Confirmación de particiones y ubicación de instalación.

```
Disk slices or filesystems (y or n)? n

The Hard disk layout you have selected is:

Drive Name Type File System/Slice
-----
0 Boot File System bfs /stand
0 Swap Slice - /dev/swap
0 Root File System ufs /

Is this correct (y or n)? y

Surface analysis will now be performed on your hard disk and
UNIX System file systems will be created on your hard disk.
This will overwrite all data in the UNIX System partition.
Please strike ENTER to continue or DEL to cancel the installation.

Checking for bad sectors in the UNIX System partition...

The following slice sizes are the recommended configuration for your disk.
A / filesystem of 946 cylinders (466 MB)
A /dev/swap slice of 65 cylinders (32 MB)
A /stand filesystem of 11 cylinders (5 MB)

Is this configuration acceptable? (y/n) _
```

(f) El sistema decide los tamaños para las particiones.

Figure 1: Configuración inicial de instalación

```

Copyright (C) 1984, 1986, 1987, 1988, 1989, 1990 AT&T
Copyright (C) 1987, 1988 Microsoft Corp.
All Rights Reserved

Confirm
Please indicate the installation medium you intend to use.
Strike "C" to install from CARTRIDGE TAPE
or "F" to install from FLOPPY DISKETTE.
Strike ESC to stop.

Please insert the UNIX System "Base System Package"
Floppy Disk 3 of 10 and then strike ENTER.

Installation is in progress -- do not remove the floppy disk.

Please insert the UNIX System "Base System Package"
Floppy Disk 4 of 10 and then strike ENTER.

Installation is in progress -- do not remove the floppy disk.
ds=

```

(a)

```

Please insert the UNIX System "Base System Package"
Floppy Disk 4 of 10 and then strike ENTER.

Installation is in progress -- do not remove the floppy disk.
ds

Please insert the UNIX System "Base System Package"
Floppy Disk 5 of 10 and then strike ENTER.

Installation is in progress -- do not remove the floppy disk.

Please insert the UNIX System "Base System Package"
Floppy Disk 6 of 10 and then strike ENTER.

Installation is in progress -- do not remove the floppy disk.

Please insert the UNIX System "Base System Package"
Floppy Disk 7 of 10 and then strike ENTER.

Installation is in progress -- do not remove the floppy disk.

```

(b)

```

Please insert the UNIX System "Base System Package"
Floppy Disk 5 of 10 and then strike ENTER.

Installation is in progress -- do not remove the floppy disk.

Please insert the UNIX System "Base System Package"
Floppy Disk 6 of 10 and then strike ENTER.

Installation is in progress -- do not remove the floppy disk.

Please insert the UNIX System "Base System Package"
Floppy Disk 7 of 10 and then strike ENTER.

Installation is in progress -- do not remove the floppy disk.

Please insert the UNIX System "Base System Package"
Floppy Disk 8 of 10 and then strike ENTER.

Installation is in progress -- do not remove the floppy disk.

```

(c)

```

Please insert the UNIX System "Base System Package"
Floppy Disk 7 of 10 and then strike ENTER.

Installation is in progress -- do not remove the floppy disk.

Please insert the UNIX System "Base System Package"
Floppy Disk 8 of 10 and then strike ENTER.

Installation is in progress -- do not remove the floppy disk.

Please insert the UNIX System "Base System Package"
Floppy Disk 9 of 10 and then strike ENTER.

Installation is in progress -- do not remove the floppy disk.

Please insert the UNIX System "Base System Package"
Floppy Disk 10 of 10 and then strike ENTER.

Installation is in progress -- do not remove the floppy disk.

```

(d) Ultimo Diskette 10 de 10

Figure 2: Proceso secuencial de instalación, intercambio de diskettes

```

Enter a password for the 'root' or super-user.

(Note: This password must be kept EXTREMELY secure):
New password:
Re-enter new password:

Enter a password for the 'install' user.

(Note: This password must be kept EXTREMELY secure,
and should be different from the root password):
New password:
Re-enter new password:

Enter a password for the 'service' user (used by the service personnel
for maintenance and software updates).

(Note: This password must be kept EXTREMELY secure,
and should be different from the root and install passwords):
New password:
Re-enter new password:

Please enter a System Name for this system. This will set the "node" name
and the "system" name. This name will be used for uuwp(1) and networking.
Enter System Name: hectorutp_

```

(a) Configuración Inicial de usuarios del sistema *root*, *install*, *service*

```

Setting up new kernel environment
The system is coming up. Please wait.
The system is ready.

Welcome to the AT&T 386 UNIX System
System name: fsociety

Console Login: root
Password:
Your password has expired. Choose a new one
New password:
Re-enter new password:
UNIX System U/386 Release 4.0 Version 2.1
fsociety
Copyright (C) 1984, 1986, 1987, 1988, 1989, 1990 AT&T
Copyright (C) 1987, 1988 Microsoft Corp.
All Rights Reserved

/          :   Disk space: 442.91 MB of 457.46 MB available (96.82%)
/stand     :   Disk space:  4.56 MB of   5.41 MB available (84.27%)
Total Disk Space: 447.48 MB of 462.87 MB available (96.67%).

```

(b) Logueo exitoso al sistema usando la cuenta de *root*

```

          Installation is in progress -- do not remove the floppy disk.

This package is an OA&M style package. To install this
package type in:

          pkgadd -d diskette1

# _

```

(c) Instalación de paquetes, OA&M

```

WARNING:
The <license16> package "UNIX System U/386 Release 4.0
16 User License Package" is a prerequisite package and
should be installed.

Do you want to continue with the installation of this package [y,n,?] y
## Verifying disk space requirements.

Installing UNIX System U Release 4.0 16 to Unlimited User License Package as <license>
## Installation of part 1 of 1 is complete.
## Executing postinstall script.

This package upgrades you from a 16 User System to Unlimited User License. Your
system is currently a 2 User System and therefore this upgrade cannot be used.

pkgadd: ERROR: postinstall script did not complete successfully

Installation of <license> failed.

Insert diskette into Floppy Drive 1.
Type [go] when ready,
or [q] to quit:

```

(d) Instalación de paquetes, OA&M y licencia para más de 16 usuarios

```

Created v/vt132
Created v/vt50
Created v/vt50h
Created v/vt52
Created v/vt61
Linked v/vt-61
Linked v/vt61.5
Created v/vt125
Created g/gt40
Created g/gt42
Created g/gigi
Linked v/vk100
Created d/dw1
Created d/dw2
Linked d/decwriter
Linked d/decwriter
Linked d/dw
Created d/dw3
Linked l/la120
Created d/dw4
Created v/vt220
Created d/diablo
Linked l/1620
Linked l/1640
Linked 4/450

```

(e) Instalación de Paquetes Xenix, Drivers y pseudo dispositivos

```

## Installing part 1 of 1.
[ verifying class <none> ]

Installation of <windowing> was successful.

Insert diskette into Floppy Drive 1.
Type [go] when ready,
or [q] to quit: go

Installation in progress. Do not remove the diskette.

The following packages are available:
  1  compat      BSD compatibility package
      (i386) 2.1

Select package(s) you wish to process (or 'all' to process
all packages). (default: all) [?,??,ql: all

Processing package instance <compat> from <diskette1>

BSD compatibility package
Version 2.1 (i386)

```

(f) Instalación del software de compatibilidad BSD

Figure 3: Instalación de paquetes y software extra en el sistema.

```

pkgadd -d diskette1

# pkgadd -d diskette1

Insert diskette into Floppy Drive 1.
Type [go] when ready,
  or [q] to quit: go

Installation in progress. Do not remove the diskette.

The following packages are available:
  1 face      AT&T Framed Access Command Environment
              (i386) 4.0 2.1

Select package(s) you wish to process (or 'all' to process
all packages). (default: all) [?,??,q]: all

Processing package instance <face> from <diskette1>

AT&T Framed Access Command Environment
Version 4.0 2.1 (i386)

```

(a) Instalacion de Paquete Extra, Framed Access Command Environment

```

Processing package instance <oam> from <diskette1>

Operations, Administration, and Maintenance
Version 2.1 (AT386)
Copyright (C) 1989 AT&T
All Rights Reserved

You are about to install the Operations, Administration and Maintenance
(OA&M) user interface.

OA&M can be installed in one of two ways.

The BASIC user interface provides a concise set of tools for basic
system administration. This will help you conserve disk space.

The EXTENDED user interface provides extensions to the BASIC interface
and access to the full OA&M feature set. BASIC installs automatically
if you choose EXTENDED.

Do you wish to install both the BASIC and EXTENDED portions of the OA&M user
interface? (default: y) y

Do you wish to install on-line help for OA&M? (default: y) _

```

(b) Prueba de Soporte Extendido

```

## Processing package information.
## Processing system information.
## Verifying package dependencies.
WARNING:
  The <fml> package "AT&T Form and Menu Language
  Interpreter" is a prerequisite package and should be
  installed.

Do you want to continue with the installation of this package [y,n,?] y
## Verifying disk space requirements.

Installing Operations, Administration, and Maintenance as <oam>

## Executing preinstall script.

Please set a password for your OA&M administrative login <sysadm> now.

New password:
Re-enter new password:
## Installing part 1 of 3.

Insert diskette 2 of 3 into Floppy Drive 1
Type [go] when ready,
  or [q] to quit: go

```

(c) Paquete de herramientas para la administracion y mantenimiento del sistema

```

  or [q] to quit: go
## Installing part 3 of 3.
[ verifying class <OAM_extended> ]
/var/sadm/pkg/oam/save/intf_install/bkup.mi
/var/sadm/pkg/oam/save/intf_install/devices.mi
/var/sadm/pkg/oam/save/intf_install/file.mi
/var/sadm/pkg/oam/save/intf_install/oam.mi
/var/sadm/pkg/oam/save/intf_install/rest.mi
## Modifying interface menus and directories
## Committing interface changes.
/usr/sadm/sysadm/menu/devices/devices.menu
/usr/sadm/sysadm/menu/files/file.menu
/usr/sadm/sysadm/menu/softwaremgmt/software.menu
## Modifying interface express mode invocation file.
## Interface installation for <oam> completed successfully.
[ verifying class <OAMmif> ]
[ verifying class <OAM_bhelp> ]
[ verifying class <OAM_ehelp> ]
## Executing postinstall script.

Installation of <oam> was successful.

Insert diskette into Floppy Drive 1.
Type [go] when ready,
  or [q] to quit: _

```

(d) Verificacion y pruebas de instalacion paquetes de administracion

```

## Verifying disk space requirements.

Installing DFS Utilities as <dfs>

## Installing part 1 of 1.
[ verifying class <none> ]
## Executing postinstall script.

Installation of <dfs> was successful.

Processing package instance <rpc> from <diskette1>

Remote Procedure Call Utilities
Version 4.0 2.1 (i386)
AT&T-SF
## Processing package information.
## Processing system information.
  8 package pathnames are already properly installed.
## Verifying package dependencies.
## Verifying disk space requirements.

Installing Remote Procedure Call Utilities as <rpc>

## Installing part 1 of 1.

```

(e) Instalacion de Paquetes DFS

Figure 4: Instalacion de Paquetes completa

4 MANEJO DE ARCHIVOS Y ESTRUCTURA

El sistema de archivos que se encuentra en este sistema operativo es de tipo jerárquico, las carpetas tiene un directorio padre, y apartir de allí tenemos un uso estándar tal cual como se encuentra documentado para el estándar POSIX. El Unix File System (UFS) es un sistema de archivos utilizado por varios sistemas operativos UNIX y POSIX. Es un derivado del Berkeley Fast File System (FFS), el cual es desarrollado desde FS UNIX (este último desarrollado en los Laboratorios Bell).

```
# ls
altboot      etc          install      opt          service      u
bin          export       lib          proc         shlib        unix
dev          home        lost+found  quotas       stand        usr
dgn          home2       mnt         sbn          tmp          var
# _
```

Figure 5: Sistema de Archivos Disponible

Para el manejo de archivos el sistema operativo cuenta con los comandos apropiados para realizar las tareas como creacion,actualizacion,eliminacion,lectura.

5 EJECUCION COMANDOS

```
# cal
      March 2018
Su M Tu W Th F S
          1  2  3
 4  5  6  7  8  9 10
11 12 13 14 15 16 17
18 19 20 21 22 23 24
25 26 27 28 29 30 31

# calendar
#
```

(a)

```
chgrp  echo  id  nice  shl  uugetty
chmod  ed  idas  nl  sleep  uugetty
chown  egrep  idcc  nohup  sort  uulog
chrhl  env  idid  notify  spline  uuuname
ckdate  expr  infocmp  oawk  srchtxt  uustat
ckgid  exstr  installpkg  od  stop  uuto
ckint  factor  ipcrm  pack  strchg  uux
ckitem  false  ipcs  page  strconf  vacation
ckkeywd  fdetach  join  passwd  strings  vax
ckpath  fgrep  jsh  paste  stty  vtlmgr
ckrange  file  kill  pcat  su  wc
ckstr  find  ksh  pdp11  sum  what
cktime  fmt  last  pg  sync  who
ckuid  fmtmsg  lc  pg  tabs  write
ckyorn  fold  license  pkginfo  tail  x286
clear  gcore  line  pkgmk  tar  x286emul
cmp  gencat  listdgrp  pkgparam  tee  xargs
col  getdate  listusers  pkgproto  telinit  xtract
colltbl  getdev  ln  pkgtrans  test  zcat
comm  getdgrp  login  pr  tic
compress  getgid  logins  printf  time
cp  getint  logname  priocntl  time
cpio  getkeywd  ls  ps  time
cpset  getopt  mail  putdev  touch
# d_
```

(b)

```
ckint  factor  ipcrm  pack  stop  uuto
ckitem  false  ipcs  page  strchg  uux
ckkeywd  fdetach  join  passwd  strconf  vacation
ckpath  fgrep  jsh  paste  strings  vax
ckrange  file  kill  pcat  stty  vtlmgr
ckstr  find  ksh  pcat  su  wc
cktime  fmt  last  pdp11  sum  what
ckuid  fmtmsg  lc  pg  sync  who
ckyorn  fold  license  pkginfo  tabs  write
clear  gcore  line  pkgmk  tail  x286
cmp  gencat  listdgrp  pkgparam  tar  x286emul
col  getdate  listusers  pkgproto  tee  xargs
colltbl  getdev  ln  pkgtrans  telinit  xtract
comm  getdgrp  login  pr  test  zcat
compress  getgid  logins  printf  tic
cp  getint  logname  priocntl  time
cpio  getkeywd  ls  ps  time
cpset  getopt  mail  putdev  touch
# id
uid=0(root) gid=1(other)
# who
root console Mar 19 19:31
# whoami
whoami: not found
# mail
No mail.
# license
This system has per user licensing limited to 2 concurrent users.
# pkginfo
system dfm Built into the Base, can not be removed.
system sys Built into the Base, can not be removed.
system usrenv Built into the Base, can not be removed.
# ps
PID TTY TIME CMD
152 console 0:01 sh
188 console 0:00 ps
# dd_
```

(c)

```
# id
uid=0(root) gid=1(other)
# who
root console Mar 19 19:31
# whoami
whoami: not found
# mail
No mail.
# license
This system has per user licensing limited to 2 concurrent users.
# pkginfo
system dfm Built into the Base, can not be removed.
system sys Built into the Base, can not be removed.
system usrenv Built into the Base, can not be removed.
# ps
PID TTY TIME CMD
152 console 0:01 sh
188 console 0:00 ps
# dd_
```

(d)

```
## Verifying disk space requirements.

Installing DFS Utilities as <dfs>

## Installing part 1 of 1.
[ verifying class <none> ]
## Executing postinstall script.

Installation of <dfs> was successful.

Processing package instance <rpc> from <diskette1>

Remote Procedure Call Utilities
Version 4.0 2.1 (i386)
AT&T-SF
## Processing package information.
## Processing system information.
8 package pathnames are already properly installed.
## Verifying package dependencies.
## Verifying disk space requirements.

Installing Remote Procedure Call Utilities as <rpc>

## Installing part 1 of 1.
```

(e)

Figure 6: Ejecución de Comandos Unix, Múltiples comandos por ventana.

Se hace uso de los siguientes comandos:

1. **vi** :Editor por defecto
2. **installpkg**: Instalación de paquetes en unix
3. **cd**: movimiento entre directorios
4. **ps**: muestra la lista de procesos en ejecución.
5. **cal**: calendario de mes.
6. **calendar**: lista actividades del cron del sistema.
7. **chown**: cambio de permisos para archivos en el sistema.
8. **mail**: muestra email recibidos por root@fsociety, donde fs.
9. **who**: identifica el usuario en uso.
10. **ls**: lista los contenidos de una carpeta.
11. **chgrp**: cambia de grupo para archivos y carpetas.
12. **date**: fecha establecida en el sistema
13. **mount**: puntos de montaje, particiones.
14. **fsck**: Verificación del sistema de archivos, revisión de bloques malos.
15. **mkdir**: Creación de carpetas.
16. **touch**: Crear archivos vacíos
17. **cron**: Agenda miento de tareas en el sistema
18. **more**: Paginador para ver contenido de manera porcentual.
19. **adduser**: Agregar usuarios al sistema.
20. **awk**: Filtrar y procesar textos de una manera sencilla.

```
# adduser
USAGE: /sbin/adduser <login id> <name> <user id> <home directory>
# adduser 400 hfjs 444 /home
/home directory already exists. Choose another HOME directory.
# _
```

(a)

```
# cd /tmp
# chown 000 hector.txt
# ls
hector.txt sa.adrfl
# ls -la
total 6
drwxrwxrwt  2 sys  sys    512 Mar 19 20:31 .
drwxrwxr-x 20 root  sys    512 Mar 19 20:12 ..
-rw-r--r--  1 root  other   0 Mar 19 20:15 hector.txt
-rw-rw-r--  1 root  sys    432 Mar 19 20:12 sa.adrfl
# _
```

(b)

```
# date
Mon Mar 19 20:33:59 EST 2018
# mount
/ on /dev/root read/write/setuid on Mon Mar 19 20:12:45 2018
/proc on /proc read/write on Mon Mar 19 20:12:45 2018
/dev/fd on /dev/fd read/write on Mon Mar 19 20:12:45 2018
/stand on /dev/dsk/0s10 read/write on Mon Mar 19 20:12:45 2018
# fsck
** /dev/root
** Currently Mounted on /
** Phase 1 - Check Blocks and Sizes
** Phase 2 - Check Pathnames
** Phase 3 - Check Connectivity
** Phase 4 - Check Reference Counts
** Phase 5 - Check Cyl groups
2201 files, 15269 used, 451065 free (169 frags, 112724 blocks, 0.0% fragmenta
n)
/dev/root FILE SYSTEM STATE SET TO OKAY
***** FILE SYSTEM WAS MODIFIED *****
bfs fsck: /dev/dsk/0s10 file system is mounted as a block device, ignored
# _
```

(c)

Figure 7: Ejecución de Comandos Unix, Múltiples comandos por ventana.

6 REFERENCIAS

- Installation of Unix System V on virtualbox Youtube, <https://www.youtube.com/watch?v=6P57ukAtCGs>
- Unix File System, <https://es.wikipedia.org/wiki/Unix-File-System>
- System V Definition, <http://www.linfo.org/system-v.html>