

# Administración de sistemas GNU/ Linux

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## Introducción

Los sistemas GNU/Linux han alcanzado un grado de madurez significativa, que los hacen perfectamente válidos para su integración en cualquier ambiente de trabajo, ya sea desde el escritorio del PC personal, un elemento de movilidad (como tabletas o móviles), hasta el servidor de una gran organización o el conjunto de ellos integrados en una infraestructura de *cloud computing*.

El objetivo principal que nos proponemos es nuestra introducción al mundo de la administración de los sistemas GNU/Linux.

Aprenderemos cómo proporcionar desde GNU/Linux los servicios necesarios a diferentes ambientes de usuarios y máquinas. El campo de estudio de la administración de sistemas es de dimensiones muy amplias, y variado en conocimientos necesarios. Existe gran número de tareas diferentes a realizar, amplios problemas por tratar, y deberemos disponer de grandes conocimientos de hardware y software. Asimismo, tampoco estaría de más un poco de psicología para tratar con los usuarios finales de los sistemas.

No se pretende abordar en el presente material una distribución GNU/Linux particular, pero se han escogido un cierto número de ellas por su amplio uso. Para tratar la mayoría de ejemplos de las tareas, utilizaremos un par de estas distribuciones de forma destacada: Debian y Fedora.

Respecto al campo de la administración, ésta se intentará gestionar desde el nivel más bajo posible, normalmente desde la línea de comandos y los propios ficheros de configuración de los servicios involucrados. Se comentarán, en su caso, algunas herramientas de más alto nivel. Pero hay que tener cuidado con estas últimas, ya que suelen ser fuertemente dependientes de la distribución utilizada, e incluso de la versión concreta de esta; además, estas herramientas suelen variar funcionalidades entre versiones. La administración de bajo nivel suele ser mucho más dura, pero conocemos con qué estamos operando y dónde podemos obtener los resultados, además de que nos aporta muchos más conocimientos extra, y control preciso sobre las diferentes tecnologías utilizadas.

Las distribuciones escogidas han sido las últimas disponibles de: Debian (o compatibles como las variantes de Ubuntu), y Fedora (o compatibles como diferentes versiones comerciales de Red Hat, o de comunidad como CentOS), siendo estas (Debian y Fedora) algunas las más utilizadas en el momento de editar estos materiales. La distribución Debian es un paradigma dentro del movimiento Open Source, por no pertenecer a ninguna empresa y estar confeccionada básicamente por las aportaciones de los voluntarios distribuidos por todo el mundo. Debian, además, integra casi exclusivamente software libre (pueden añadirse otros aparte). Además, gran número de distribuciones con éxito importante (como las variantes de Ubuntu, que de hecho han superado a Debian como uso en escritorio) tienen a Debian como distribución base.

Red Hat, por otra parte, es una de las empresas más solventes en el panorama comercial GNU/Linux, y por eso sea quizás la que otorgue más soporte a nivel empresarial (mediante servicios de soporte de pago), mediante sus distribuciones comerciales de Red Hat Enterprise Linux (también existen variantes libres alternativas como CentOS). Por otra parte, su entrada como patrocinador ha permitido ampliar los resultados del proyecto Fedora (y la consecuente distribución GNU/Linux), como conjunto de test para sus distribuciones posteriores, y un desarrollo de una amplia comunidad que ha crecido a su alrededor. Este caso forma una interesante experiencia combinada de comunidad y empresa en el desarrollo de la distribución (como después adoptaron otros distribuidores, como el caso de la versión comercial SUSE Linux y su proyecto de comunidad OpenSUSE).

Por el contrario, en Debian el soporte depende de los voluntarios y del conocimiento compartido de los usuarios, centrándose en su comunidad, aunque en los últimos tiempos también ha recibido el soporte (no sin ciertos problemas en el proceso) de Canonical, desarrollador de Ubuntu.

Siendo la administración de sistemas un campo tan amplio, este manual solo pretende introducirnos en este apasionante (y cómo no, también a veces frustrante) mundo. Veremos algunas de las tareas típicas, y cómo tratar las problemáticas que nos aparecen. Pero la administración es un campo que se aprende día a día, con la resolución de tareas diarias.

Y desde aquí advertimos que este manual es un trabajo abierto, que con sus aciertos y los más que probables errores se puede ver complementado con los comentarios de sus (sufridores) usuarios. De modo que son bienvenidos, por parte de los autores, cualquier tipo de comentarios y sugerencias de mejora de los presentes materiales.

Comentamos, por último, que el contenido refleja el estado de las distribuciones y de las herramientas de administración en el momento de su edición, o de las correspondientes revisiones o reediciones.

**Nota**

Principales distribuciones y empresas comentadas en el texto:

<http://www.debian.org/>

<http://www.ubuntu.com/>

<http://www.canonical.com/>

<http://fedoraproject.org/>

<http://www.redhat.com/>

<http://www.centos.org/>

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## Bibliografía

**[Bai03] Bailey, E. C.** (2003). *RedHat Maximum RPM*. <http://www.redhat.com/docs/books/max-rpm/index.html>

Ofrece una amplia visión de los sistemas de paquetes de software de las distribuciones Debian y Fedora/Red Hat.

**[Ban] Banerjee, T.** "Linux Installation Strategies HOWTO". *The Linux Documentation Project*.

**[Bar] Barrapunto.** *barrapunto site*. Noticias Open Source. <http://barrapunto.com>

**Barnett, B.** "AWK". <http://www.grymoire.com/Unix/Awk.html>. © General Electric Company.

**[Bas] Mike, G.** "BASH Programming - Introduction HOWTO". *The Linux Documentation Project*.

Ofrece una amplia introducción (y conceptos avanzados) a la programación de en *shell scripts bash*, así como numerosos ejemplos.

"Big Admin: Script Examples". <http://www.sun.com/bigadmin/scripts/filter.jsp>

**[Bro01] Bronson, Scott** (2001). "VPN PPP-SSH". *The Linux Documentation Project*.

**[Bul] Bulma. "Bulma Linux User Group"**. <http://bulmalug.net>. Documentación general y comunidades de usuarios.

**[Cen]**. "The Community ENTerprise Operatyng System". <http://www.centos.org>

**[Cis00] Cisco** (2000). "TCP/IP White Paper". <http://www.cisco.com>

**[Com01] Comer, Douglas** (2001). *TCP/IP Principios básicos, protocolos y arquitectura*. Prentice Hall.

**[Coo] Cooper, M.** (2006). "Advanced bash Scripting Guide". *The Linux Documentation Project* (guías). <http://tldp.org/LDP/abs/html/index.html>

**[Deb] Debian.** "Sitio Seguridad de Debian". <http://www.debian.org/security/>

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Ofrece una amplia visión de los sistemas de paquetes de software de las distribuciones Debian y Fedora/Red Hat.

**[Debba] Debian.** "Software Libre vs Software Abierto". <http://www.debian.org/intro/free.es.html>

**[Dis] Distrowatch.** "Distribuciones Linux disponibles" <http://www.distrowatch.com>.

Seguimiento de las distribuciones GNU/Linux, novedades de los paquetes software y enlaces a los sitios de descarga de las imágenes ISO de los CD/DVD de las distribuciones GNU/Linux.

**[Dra99] Drake, Joshua** (1999). "Linux Networking". *The Linux Documentation Project*

**[Fed] The Fedora Project.** <http://fedoraproject.org>.

**[FHS]** (2003). *FHS Standard*. <http://www.pathname.com/fhs>

**[Fre] Freshmeat.** *Freshmeat site*. <http://freshmeat.org>. Listado de proyectos Open Source.

**[Fri02] Frisch, A.** (2002). *Essential System Administration*. O'Reilly.

Administración de GNU/Linux y UNIX. Comenta de forma amplia aspectos de administración local y gestión de sistemas de impresión.

**[FSF] FSF.** "Free Software Foundation y Proyecto GNU" <http://www.gnu.org>.

**[Gar98] Garbee, Bdale** (1998). *TCP/IP Tutorial*. N3EUA Inc.

**Garrels, Machtelt.** "Bash Guide for Beginners" <http://tldp.org/LDP/Bash-Beginners-Guide/html/index.html>.

**[Gnu] Gnupg.org.** *GnuPG Web Site* <http://www.gnupg.org/>

**[Gon] Gonzato, G.** "From DOS/Windows to Linux HOWTO". *The Linux Documentation Project*.

**[Gt] Taylor, G.; Allaert, D.** "The Linux Printing HOWTO". *The Linux Documentation Project*. <http://www.linuxprinting.org/>

Ofrece información actualizada de los sistemas de impresión y su configuración, así como detalles de algunas impresoras.

**[Hin00] Hinner, M.** "Filesystems HOWTO". *The Linux Documentation Project*.

Información sobre los diferentes sistemas de ficheros disponibles y los esquemas de creación de particiones para la instalación del sistema.

**[His] HispaLinux.** "Comunidad Hispana de Linux" <http://www.hispalinux.es>. Documentación general y comunidades de usuarios.

**[IET]**

**[Joh08] Johnson, Michael K.** (1998). "Linux Information Sheet". *The Linux Documentation Project*.

**[KD00] Kirch, Olaf; Dawson, Terry.** *Linux Network Administrator's Guide.*

**[Knp]** Distribución Knoppix.<http://knoppix.org>

**[Koe] Koehntopp, K.** "Linux Partition HOWTO". *The Linux Documentation Project.*

Información sobre los diferentes sistemas de ficheros disponibles y los esquemas de creación de particiones para la instalación del sistema.

**[Law07] Lawyer, David** (2007). "Linux Módem". *The Linux Documentation Project.*

**[Lev] Levenez, Eric.** "UNIX History" <http://www.levenez.com/unix>.

**[Lin04b]** (2004). *Filesystem Hierarchy Standard (FHS)*. <http://www.pathname.com/fhs>

**[Linc]** *Linux Standards Base project* <http://www.linux-foundation.org/en/LSB>

*Linux Magazine.* Revista GNU/Linux <http://www.linux-mag.com/>.

**[Log]** LogCheck <http://logcheck.org/>.

**[LPD] LPD.** *The Linux Documentation Project* <http://www.tldp.org>.

Proporciona los *Howto* de los diferentes aspectos de un sistema GNU/Linux y un conjunto de manuales más elaborados.

**[Mal96] Mallett, Fred** (1996). *TCP/IP Tutorial*. FAME Computer Education.

"Man bash". <http://www.gnu.org/software/bash/manual/bashref.html>

**Mike, G..** "Programación en BASH - COMO de introducción" <http://es.tldp.org/COMO-INSFLUG/COMOs/Bash-Prog-Intro-COMO/>.

**[Mon]** Monit. <http://www.tildeslash.com/monit/>.

**[Mor 03] Morill, D.** (2003). *Configuración de sistemas Linux*. Anaya Multimedia.

Buena referencia de configuración de sistemas Linux, con algunos casos de estudio en diferentes entornos; comenta diferentes distribuciones Debian y Red Hat.

**[Mou01] Mourani, Gerhard** (2001). *Securing and Optimizing Linux: The Ultimate Solution*. Open Network Architecture, Inc. <http://www.tldp.org/LDP/solrhe/Securing-Optimizing-Linux-The-Ultimate-Solution-v2.0.pdf>.

**[Nem06] Nemeth, E.; Snyder, G.; Hein, T. R.**

Trata de forma amplia la mayoría de aspectos de administración y es una buena guía genérica para cualquier distribución.

**[New] Newsforge.** "Newsforge site" <http://newsforge.org>. Noticias Open Source.

**[Nt3] NTFS-3g Project.** NTFS-3G Read/Write Driver <http://www.ntfs-3g.org/>

**O'Reilly Associates** (2000). <http://www.tldp.org/guides.html>. Y como *e-book (free)* en Free Software Foundation, Inc.

**[OSDb] OSDN.** "Open Source Development Network" <http://osdn.com>. Comunidad de varios sitios web, noticias, desarrollos, proyectos, etc.

**[OSIa] OSI OSI.** "Listado de licencias Open Source" <http://www.opensource.org/licenses/index.html>.

**[OSIb] OSI** (2003). "Open Source Definition" <http://www.opensource.org/docs/definition.php>.

**[OSIc] OSI** (2003). "Open Source Initiative" <http://www.opensource.org>.

**[PPP00] Linux PPP** (2000). "Corwin Williams, Joshua Drake and Robert Hart". *The Linux Documentation Project*.

**[Pri] Pritchard, S.** "Linux Hardware HOWTO". *The Linux Documentation Project*.

**[Enr02] Enríquez, R.; Sierra, P.** (2002). *Open Source*. Anaya Multimedia.

**[Qui01] Quigley, E.** (2001). *Linux shells by Example*. Prentice Hall.

Comenta los diferentes *shells* de programación en GNU/Linux, así como sus semejanzas y diferencias.

**[Ran05] Ranch, David** (2005). "Linux IP Masquerade" . *The Linux Documentation Project*.

**[Ran05] Tapsell, John** (2005). "Masquerading Made Simple" . *The Linux Documentation Project*.

**[Ray98] Raymond, Eric** (1998). *La catedral y el bazar*. <http://es.tldp.org/Otros/catedral-bazar/cathedral-es-paper-00.html>

**[Ray02a] Raymond, Eric** (2002). "UNIX and Internet Fundamentals". *The Linux Documentation Project*.

**[Rayb] Raymond, Eric.** "The Linux Installation HOWTO". *The Linux Documentation Project*.

**Red Hat Inc.** "Distribución Red Hat" <http://www.redhat.com>.

**[Revista Linux] Linux Journal.** Revista GNU/Linux <http://www.linuxjournal.com>.

**[Rid00] López Ridruejo, Daniel** (2000). "The Linux Networking Overview". *The Linux Documentation Project*.

**Robbins, Arnold**. "UNIX in a Nutshell" (3.<sup>a</sup> ed.) <http://oreilly.com/catalog/unixnut3/chapter/ch11.html>.

"The GNU awk programming language" [http://tldp.org/LDP/Bash-Beginners-Guide/html/chap\\_06.html](http://tldp.org/LDP/Bash-Beginners-Guide/html/chap_06.html).

**[Sal94] Salus, Peter H.** (1994, noviembre). "25 aniversario de UNIX". *Byte España* (núm. 1).

Scientific Linux <http://www.scientificlinux.org>.

**[Sam]**. Samba Project <http://samba.org>.

**[Sama]**. "Samba HOWTO and Reference Guide" (Chapter Domain Control) <http://samba.org/samba/docs/man/Samba-HOWTO-Collection/samba-pdc.html>.

**[Samb]**. "Samba Guide" (Chapter Adding Domain member Servers and Clients) <http://samba.org/samba/docs/man/Samba-Guide/unixclients.html>.

**[Sec00] Seco, Andrés** (2000). "Diald". *The Linux Documentation Project*.

**[Skob] Skoric, M.** "Linux+WindowsNT mini-HOWTO". *The Linux Documentation Project*.

**[Sla] Slashdot**. "Slashdot site" <http://slashdot.org>. Sitio de noticias comunidad Open Source y generales informática e Internet.

**[SM02] Schwartz, M. y otros** (2002). *Multitool Linux - Practical Uses for Open Source Software*. Addison Wesley.

**[Smb]**. "Server Message Block". *Wikipedia* [http://en.wikipedia.org/wiki/Server\\_Message\\_Block](http://en.wikipedia.org/wiki/Server_Message_Block).

**[Smi02] Smith, R.** (2002). *Advanced Linux Networking*. Addison Wesley.

Administración de GNU/Linux y UNIX. Comenta de forma amplia aspectos de administración local y gestión de sistemas de impresión.

**[Sob10] Sobell, M. G.** (2010). *A Practical Guide to Fedora and Red Hat Enterprise Linux*. Prentice Hall.

Es una buena guía de administración local para distribuciones Red Hat y Fedora.

**[Sou] Sourceforge**. "Sourceforge site" <http://sourceforge.org>. Listado de proyectos Open Source.

**[Sta02] Stallman, Richard** (2002). "Discusión por Richard Stallman sobre la relación de GNU y Linux" <http://www.gnu.org/gnu/linux-and-gnu.html>.

**[Ste07] French, S.** "Linux CIFS Client Guide" <http://us1.samba.org/samba/ftp/cifs-cvs/linux-cifs-client-guide.pdf>.

**[Stu] Stutz, M.** "The Linux Cookbook: Tips and Techniques for Everyday Use" (guías). *The Linux Documentation Project*.

Es una amplia introducción a las herramientas disponibles en GNU/Linux.

**[Sun 02] Sundaram, R.** (2002). "The dosemu HOWTO". *The Linux Documentation Project*.

**[Tan87] Tanenbaum, Andrew** (1987). *Sistemas operativos: diseño e implementación*. Prentice Hall.

**[Tan06] Tanenbaum, Andrew; Woodhull, Albert S.** (2006). *The Minix Book: Operating Systems Design and Implementation* (3.<sup>a</sup> ed.). Prentice Hall.

*The Dot Gnu Project*. <http://www.gnu.org/software/dotgnu/>

**[Tri] Tripwire.com.** "Tripwire Web Site" <http://www.tripwire.com/>.

**[Ubn].** Distribución Ubuntu <http://www.ubuntu.com>.

**[Vas00] Vasudevan, Alavoor** (2000). "Modem-Dialup-NT". *The Linux Documentation Project*.

**[War] Ward, I.** "Debian and Windows Shared Printing mini-HOWTO". *The Linux Documentation Project*.

**[Wil02] Wilson, Matthew D.** (2002). "VPN". *The Linux Documentation Project*.

Wine Project <http://www.winehq.com/>.

**[Wm02] Welsh, M. y otros** (2002). *Running Linux* (4th edition). O'Reilly.

Administración de GNU/Linux y UNIX. Comenta de forma amplia aspectos de administración local y gestión de sistemas de impresión.

**[Woo] Wood, D.** "SMB HOWTO". *The Linux Documentation Project*.

**[Xin].** "Xinetd Web Site" <http://www.xinetd.org/>