



Mondo Rescue: A GPL disaster recovery solution

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MondoRescue

Introducing myself



- Software engineering since 1988
 - Mostly Configuration Management Systems (CMS), Build systems, quality tools, on multiple commercial Unix systems
- Discover Open Source & Linux (OSL) & first contributions in 1993
- Full time on OSL since 1995, first as HP reseller then @HP
- Currently...
 - Technology Architect on OSL for the HP/Intel Solution Center, Grenoble
 - OSL HP Ambassador
 - EMEA OSL HP Profession Lead
 - Solutions Linux Conference board member
 - MondoRescue project Lead
 - Dploy.org project Lead
 - Project-Builder.org project Lead
 - LinuxCOE contributor
 - Mandriva contributor

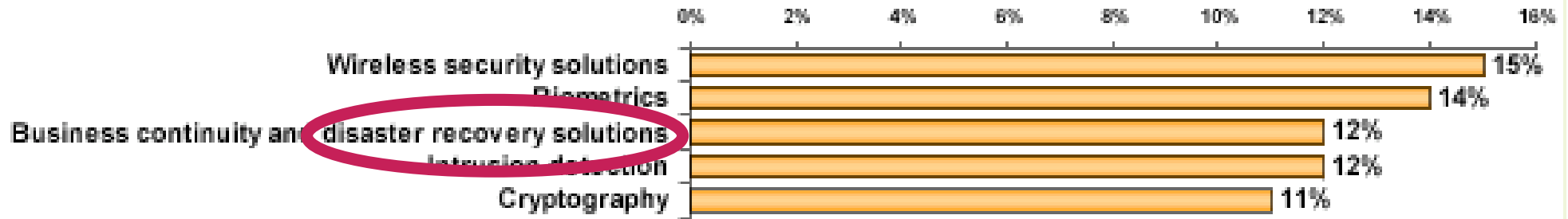




- Disaster Recovery Plan (DRP):
 - Identifying, inventorying and classifying the critical systems and data in the enterprise (in relationship with their value for the enterprise).
 - Balance between DRP implementation costs and downtime costs, or loss of data/services costs.
 - Much more paper based than computer based. However tools are also needed as part of the plan. Also DR doesn't substitute itself to backups or archives.
 - Today, among the systems to deal with, you'll have Linux systems.
- Points to consider:
 - Recovery of solutions: systems, network, storage, connectivity, HA configurations and coherency between those elements.
 - Recovery of system configuration (BIOS, Stripe size, Block size, FS layout and options, Boot loader, OS data, users and application data, ...) and coherency between those elements.



Figure 4 - Information Security Technologies - Planned for Deployment



Frost & Sullivan 2008 (ISC)2 Global information security Workforce Study
https://www.isc2.org/download/2008_Global_WF_Study.pdf

Table 2 - Top Five Security Technologies Being Deployed by Region

Rank	Americas	Asia-Pacific	EMEA
1	Biometrics	Wireless security solutions	Wireless security solutions
2	Wireless security solutions	Intrusion detection	Storage security
3	Business continuity and disaster recovery solutions	Business continuity and disaster recovery solutions	Biometrics
4	Intrusion detection	Biometrics	Risk management solutions
5	Cryptography	Cryptography	Business continuity and disaster recovery solutions



A GPL disaster recovery solution

- Distribution neutral (Mandriva, RedHat, Fedora, RHEL, OpenSuSE, SLES, Debian, Ubuntu, Gentoo, Slackware)
- Supports any FS supported by the kernel (including dual boot systems) on any disk supported (+HW Raid) and boot loader (+LVM, +SW Raid)
- Supports CD-R[W], DVD[-+]R[W], Tapes, USB disks/keys, NFS, local FS (ISO9660 files)
- Uses mindi for mini-distro (live !)
- Full or differential backups supported
- CLI + curses based UI
- System DR in minutes





The User's View

- Need for a Rescue CD for pre-installed servers in 2000
- 2 choices: mkCDrec and Mondo Rescue
- Mondo Rescue nearer to my initial needs
- Developer happy to receive patches
- -H option added

The screenshot shows a web browser window displaying the Mondo Rescue website. The browser's address bar shows `http://www.mondorescue.org/`. The website has a navigation menu with links for Home, About, News, Docs, Downloads, Artwork, Support, Wiki, and Thanks. The main content area features the Mondo Rescue logo and the heading "Mondo Rescue Home Page". Below this is a section titled "What is Mondo Rescue ?" which contains a terminal window. The terminal window displays the following text:

```
WELCOME TO MONDO RESCUE
Backup to:
CD-R disks
CD-RW disks
DVD disks
CD streamer
Tape
Please choose the backup media

Making catalog of files to be backed up
Dividing
Backing up filesystem
Copying M
Calling M
Preparing
Archiving
Done.
Done.
Done.
Done.
Done.

I am backing up your live filesystem now.
Please wait, this may take a couple of hours.
CDR 1: [*****.....] 23% used
3%
3:14 taken      82:35 remaining
3% done        97% to go

Writing bo
Boot and data disk images were created.
Boot+data disks were created OK
Archiving regular files
I am backing up your live filesystem now.
```

Below the terminal window, the website text reads: "Mondo Rescue is a GPL disaster recovery solution. It supports Linux (i386, x86_64, ia64) and FreeBSD (i386). It's packaged for multiple distributions (RedHat, RHEL, SuSE, SLES, Mandriva, Debian, Gentoo). It supports tapes, disks, network and CD/DVD as backup media, multiple filesystems, LVM, software and hardware Raid."



Archiving: mondoarchive

- Uses either bzip2, gzip or lzo for data compression
- Uses afio for reliable backup (supports compression on a file basis, ASCII headers, cpio comp.)
- Generates bootable ISO images or burns media/creates tapes or USB disks, using running kernel + modules
- Saves disk structure and content. Proliant HW information
- Runs on a live system

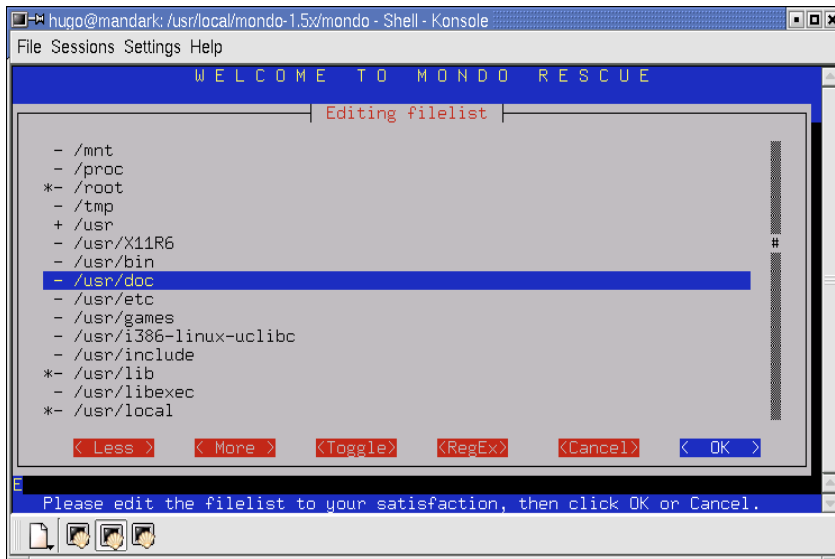


```
/usr/sbin/mondoarchive -O -d /bkp -s  
700M -p m1 -E "/usr/doc /usr/src" -N  
-T /tmp -n s1.hpintelco.org:/nfs
```



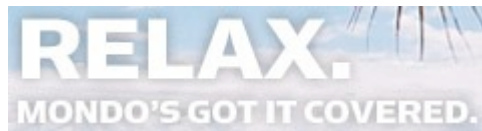
Restoring: mondorestore

- From bootable physical media (floppy, CDs, tapes, OBDR since 2.2.6, USB devices), images on disks, network (PXE), virtual media (Proliant specific)
- Interactive restore from image files under the OS
- Proliant goodies support
- Various modes: Automatic, Interactive, Expert, Compare
- Ability to change FS type, layout, SW Raid, even HW configuration.
- DR restore in minutes. But do it !





Cloning support



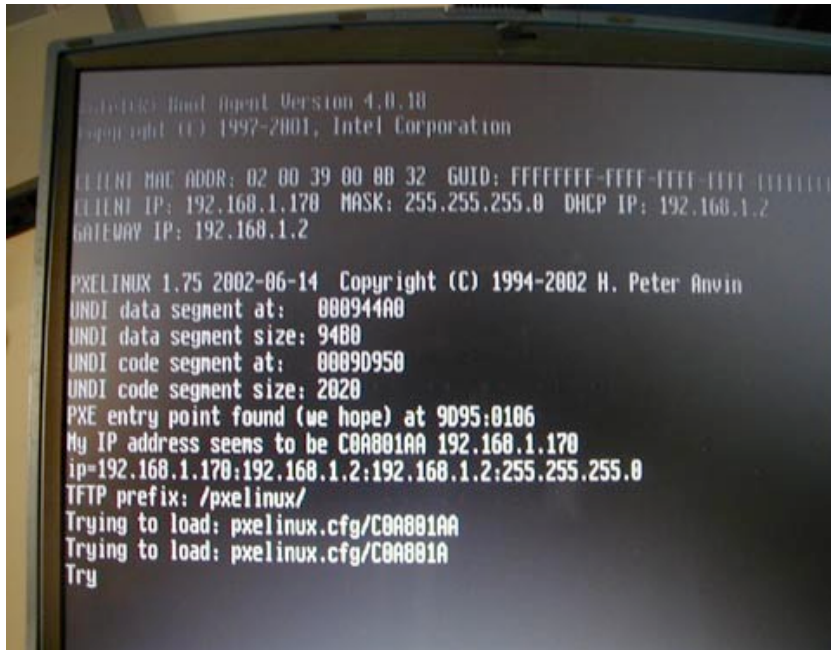
- Requires knowledge of master and target platforms (potential different drivers)
- All drivers should be part of the mindi image created (either used on master or forced in mindi)
- Use -H if master and target are identical hardware platforms
- In other cases, all functions are also available (partition resizing, filesystem type change ...) + hardware adaptation
- Improvement for mindi to include all drivers – TBC



The Contributor's View

- First patch in Dec. 2000
- First attempt of ia64 port back not published in 2001, then in Apr. 2004, and again in Nov. 2007
- Proliant fixes in Nov. 2004
- Then migration from CVS => SVN
- PXE support added in Apr. 2005
- Then no working SVN (1 year+)
- Patched 2.04 version in Sep. 2005





- Using PXE boot ROM, ability to integrate mondo images with a generic deployment server based on pxelinux.
- Ability to boot from a (central) server hosting (all) ISO images without physical media.

label mondo

```
kernel kernel/vmlinuz-mondo
```

```
append root=/dev/ram rw pxe  
initrd=initrd/initrd-mondo.img  
ramdisk_size=32768 prefix=m1  
load_ramdisk=1 prompt_ramdisk=0  
ipconf=eth1:192.168.0.1:255.255.255.  
0:192.168.0.255:192.168.0.254  
nfsmount=192.168.0.10:/mondo ping=5
```

PXE support



Proliant features



- With the iLO and Virtual Media function, ability to boot from a (central) server hosting (all) ISO images without physical media.
- Creates backup with media mounted through iLO.
- Smart Array support
- Proliant NIC support
- Hardware info backup & recovery (hpacucli, hponcfg, conrep) – preliminary support in 2.2.5





The Maintainer's View (I)

- Project Maintainer since Oct. 2005
- New subversion repository (Thanks BerliOS – HP)
- 12 versions published
- New Build process (Generated pkgs – lead to project-builder.org)
- 51 distributions (Thanks Qemu)

The screenshot shows a web browser window at <http://trac.mondorescue.org/>. The page features the MondoRescue logo and a navigation menu with links for [Login](#), [Settings](#), [Help/Guide](#), [About Trac](#), and [Register](#). The main content area is titled "Welcome to Mondo Rescue devel pages" and includes a welcome message from the Mondo Rescue Dev Team, a "Starting Points" section with links to the web site, documentation, TracGuide, and Debian BTS, and a "Contents" section listing various project pages like "Boot Process Unraveled" and "Roadmap".



The Maintainer's View (II)

- New Website (Thanks Ayo)
- Trac (260 Bugs declared – half fixed already)
- Mondorescue HOWTO Rewritten
- Mailing List activity

http://trac.mondorescue.org/report/3

France 2 : site de la chaîne de télé... Ouvrir une session "open source" "user" - Google ... {3} All Tickets by Milestone ...

2.2.2 Release

Ticket	Summary	Component	Version	Type	Severity	Owner	Created
#103	mindy doesn't support UUID needed for Ubuntu 6.10 and VMWare	mondo	2.2.0	enhancement	blocker	bruno *	11/17/06
#108	/dev fills up to 100% and stops	mondo	2.2.0	defect	blocker	bruno *	11/21/06
#119	Devices like /dev/sdn* are not created	mondo	2.2.1	defect	normal	bruno *	12/29/06
#44	mondo restore dont restore all files from the tape and remount the root partition in ro	mondo	2.0.8	defect	major	bruno *	08/15/06
#117	Mondo does not support boot loader not in MBR	mondo	2.2.1	defect	major	bruno *	12/29/06
#68	LVM log. volumes are not resized using factor which creates problems when restoring	mondo	2.0.9	enhancement	normal	bruno *	09/23/06
#82	Archiving to tape leaves out most files (biggiefiles are ok)	mondo	2.0.9	defect	normal	andree *	10/10/06
#83	Create a package hierarchy to easy installation	mondo	2.2.0	defect	normal	bruno *	10/12/06
#84	build x86_64 packages for popular distros	mondo	2.2.0	enhancement	normal	bruno *	10/13/06
#98	continue even if wrong media inserted	mondo	2.2.0	enhancement	normal	bruno	11/01/06
#102	/dev/shm Problem	mondo	2.2.0	defect	normal	bruno	11/17/06
#114	mondo restore should support -p	mondo	2.2.0	defect	normal	bruno	12/14/06
#115	Allow mondo to create bootable USB keys to restore from	mondo	2.2.0	enhancement	normal	bruno	12/19/06
#120	Mondo restore fails with kernel panic on opensuse 10.2	mondo	2.2.1	defect	normal	bruno *	12/30/06
#121	incorrect tmp dir used by mindy for copying gawk to	mindy	1.2.1	defect	normal	bruno *	12/31/06
#123	Add support for Slackware 11.0	mondo	2.2.1	defect	normal	bruno *	01/03/07
#85	abandoned files	mondo	2.0.9	defect	minor	bruno *	10/13/06
#95	Physical extent size for volume group isn't preserved	mondo	2.2.0	defect	minor	bruno	11/01/06
#109	add a timestamp to the logfile's name	mondo	2.2.0	enhancement	minor	bruno *	11/22/06

2.2.3 Release

Ticket	Summary	Component	Version	Type	Severity	Owner	Created
#118	In compare mode allow mountlist changes before operation	mondo	2.2.1	enhancement	normal	bruno	12/29/06
#122	Build a FreeBSD version	mondo	2.2.1	enhancement	normal	bruno	01/02/07

3.0.0 Release

Ticket	Summary	Component	Version	Type	Severity	Owner	Created
#1	sprintf used without checks	mondo	2.0.8	defect	normal	bruno *	07/31/06
#67	mondoarchive should have an option to select NIC	mondo	2.0.9	enhancement	normal	bruno	09/22/06



The Project Lead View (I)

- v 2.2.5
- bug fixes on 2.2.4
- Better Ubuntu and Debian support
- Proliant SSSTK support
- ia64 support
- USB key support
- Udev support
- Use Project Builder

The screenshot shows the Trac project lead view for MondoRescue. The browser window title is "Timeline - MondoRescue - Trac - Mozilla Firefox". The address bar shows the URL "http://trac.mondorescue.org/timeline". The page features a navigation menu with options like "Wiki", "Timeline", "Roadmap", "Browse Source", "View Tickets", "New Ticket", "Search", and "Admin". The main content area displays a "Timeline" section with a filter for "View changes from 05/19/08 and 30 days back." The timeline lists several changesets and tickets, including:

- 05/17/08: Changeset [1940] by bruno (02:34) - Improve log when errors on ext. attr.
- 05/17/08: Changeset [1939] by bruno (01:29) - svn merge -r 1923:1938 SVN_M/branches/2.2.6
- 05/17/08: Changeset [1938] by bruno (01:16) - Better instructions for getting support (test versions, size of ...)
- 05/15/08: Ticket #252 (defect) created by zoltak (16:44) - shm always being used and crashes mondo when out of space
- 05/15/08: Changeset [1937] by bruno (13:58) - Attempt to fix problem with SuSE 10.2 boot loader not reinstalled - may ...
- 05/11/08: Changeset [1936] by bruno (23:48) - Removal of useless tools and distributions dir
- 05/08/08: Changeset [1935] by bruno (02:14) - remove useless files
- 05/07/08: Changeset [1934] by bruno (15:08) - Handle part of #250
- 05/07/08: Changeset [1933] by bruno (14:54) - Attempt to fix #249 (adding START and STOP headers systematically for ...)
- 05/07/08: Changeset [1932] by bruno (11:54) - Attempt to solve #244 by ignoring SIGPIPE during big file restore with ...
- 05/07/08: Changeset [1931] by bruno (11:37) - Remove the useless g_sigpipe_caught bool

The bottom of the page shows a search bar with the text "Rechercher : osrb" and a status message "Terminé".



The Project Lead View (II)

- v 2.2.6
- bug fixes on 2.2.5
- Gentoo x86_64 support
- Better tape support (-G)
- OBDR support
- Remove floppy support
- New cli params for mondorestore

The screenshot shows the Trac Roadmap page for MondoRescue. The browser window title is "Roadmap - MondoRescue - Trac - Mozilla Firefox". The URL is "http://trac.mondorescue.org/roadmap". The page is logged in as "bruno". The roadmap shows four milestones:

Milestone	Progress	Closed tickets	Active tickets
Milestone: 2.2.6	3%	1	37
Milestone: 3.0.0	11%	1	8
Milestone: 3.0.1	0%	0	4
Milestone: 3.0.2	0%	0	15

At the bottom of the page, there is a search bar with the text "Rechercher : osrb" and a "Terminé" status. The footer includes the Trac logo, "Powered by Trac 0.9.6 By Edgewall Software", and a note about the project being hosted by HP Intel Solutions.



The Project Lead View (III)

- v3.0.0
- largely rewritten
- more distributions (FreeBSD)
- Internationalization (fr,us)
- Configuration files
- Code cleanup (memory management)
- Software Engineering (tests programs, splint, valgrind, coverity, fossology...)

Custom Query - MondoRescue - Trac - Mozilla Firefox

http://trac.mondorescue.org/query?status=new&status=

logged in as bruno | Logout | Settings | Help/Guide | About Trac | My Account

Custom Query (8 matches)

Filters

Status new assigned reopened closed

Milestone is

Group results by descending Show full description under each result

Ticket	Summary	Status	Owner	Type	Priority	Component
108	/dev fills up to 100% and stops	assigned	bruno	defect	high	mondo
67	mondoarchive should have an option to select NIC	new	bruno	enhancement	normal	mondo
94	Show Command Assembled in GUI	new	bruno	enhancement	normal	mondo
141	Packages should be signed	new	bruno	enhancement	normal	mondo
152	Bootable USB that backs up to DVDs	assigned	bruno	enhancement	normal	mindy
153	pre+post script & answer file	new	bruno	enhancement	normal	mondo
235	FTP support	assigned	bruno	enhancement	normal	mondo
131	Exclude /var/log/lastlog from mondoarchive ?	assigned	bruno	enhancement	low	mondo

Note: See [TracQuery](#) for help on using queries

Download in other formats: [XML](#) [RSS Feed](#) [Comma-delimited Text](#) [Tab-delimited Text](#)

Powered by Trac 0.9.6 By Edgewall Software

The Mondo Rescue project is hosted by the HP Intel Solution Center on a Mandriva system.

Rechercher : osrb Surveiller tout Respecter la casse Terminé



The Project Lead View (IV)

- Features still lacking:
 - Support of FS options
 - Support of LVM options
 - SELinux support
 - EFIbootmgr support
 - Flexibility for multi NIC systems
 - Support for additional network protocols

Look at :

- valgrind
- callgrind
- graphviz
- doxygen
- dejagnu
- cleverbox
- fusil

We should probably sign packages Check security with => <http://www.dwheeler.com/secure-programs/>

Look at tape management

"Bill R. Williams" <brw_at_etsu.edu>

```

FWIW: I seen problems with other platform/backup-software wherein the
backup was to tape and verify was attempted. (I won't mention names. :-)
```

ANYWAY, my rule of thumb regarding use of tape devices is :

```

mt -f $TAPE status
    I can check $? to see if it at least can "see" the
    device.
mt -f $TAPE rewind
    I can check $? to see if it can operate the device,
    and this will cause a "wait" until the device is
    ready.
This also always assures me that my $TAPE is at the beginning.
For those of ye saying, "Well, duh!"
Let me just say: NEVER presume that your tape is at the beginning!
There are devices which allow use of TAPE with NO-REWIND-ON
open/close.
Other "opinions" of note:
* I always set my tape device to blocksize=0 which means
  variable-blocks.
* I always write the biggest blocksize to tape that I can. The
  bigger the tape block and the faster the read/writes plus the
  more efficient use of the physical media. IOW: You get more
  data on the tape with bigger blocks.
Of course these come from the "old school" and have served me well even
up through the new LTO devices.
(Yes, I have seen open-spool tape run off the end of the reel. Go
ahead and laugh. ...was never funny at the time. :-)
```

Conferences on mondorescue:

- => [Linux.Conf.au Sidney 2007](#) => [mirror of the video](#)
- => [Solutions Linux Paris 2007](#)
- => [Linuxdays.ch Geneva 2007](#)
- => [HP Technology Forum 2008](#)
- => [OSCON 2008 \(tentative\)](#)
- => [Linux Symposium Ottawa 2008 \(tentative\)](#)

Articles on mondorescue:

- => [LinuxUser 2007-02 \(de\)](#)
- => [All about Linux 2006-03 \(en\)](#)
- => [Analysis on Mondo Rescue by Ohloh \(en\)](#)
- => [Analysis on Mondo Rescue by Swik \(en\)](#)
- => [Analysis on Mondo Rescue by Cia.vc \(en\)](#)

OSCON 2008 I'M SPEAKING

Rechercher : osrb



Web Resources

Mondorescue main site

<http://www.mondorescue.org>

Trac / Wiki

<http://trac.mondorescue.org>

Busybox

<http://www.busybox.net>

Project-Builder

<http://trac.project-builder.org>

Open Source at HP

<http://opensource.hp.com>



“The evolution of FLOSS and the Internet are tightly coupled”



Contact

”Changes are never easy to make.
There is comfort and safety in tradition, but change must come, no matter how painful or expensive it may be.”

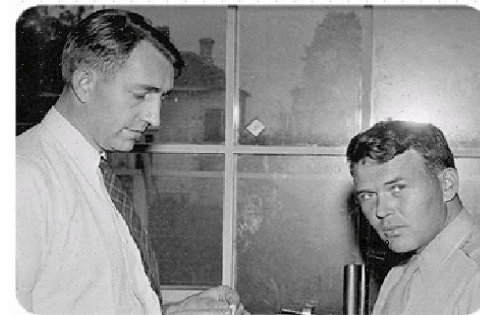
Bill Hewlett

Thanks

[Bruno_Cornec@hp.com](mailto: Bruno_Cornec@hp.com)

(Linux Solution Consultant in the
HP/Intel Solution Center)

<http://www.hp.com/linux>



Linus Torvalds, Richard Stallman, Eric Raymond, Nat Makarevitch, René Cougnenc, Eric Dumas, Rémy Card, Bdale Garbee, Hugo Rabson, Gallig Renaud, Andree Leidenfrost among others, for their work and devotion to the Open Source Software cause... and my family for his patience :-)