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XtreemOS

Integrated Project
BUILDING AND PROMOTING A LINUX-BASED OPERATING SYSTEM TO SUPPORT VIRTUAL ORGANIZATIONS FOR NEXT GENERATION GRIDS

Initial XtreemOS packaging in Debian, Mandriva and RedFlag distributions
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Executive Summary

This document presents the first release of an XtreemOS Linux distribution based on Mandriva. This Linux distribution is a first prototype and includes some XtreemOS components. It provides both Linux-XOS and LinuxSSI-XOS, as well as some XtreemOS-G components.

The first chapter of this document discuss the packaging of XtreemOS as RPM for Mandriva. It also discuss the issue of Debian packages for all XtreemOS components, the possibility of using Alien to use the RPM packages and the limitations and possible solutions. The second and third chapter discuss the creation of the XtreemOS Linux distribution as an installable CD, and a bootable Live-CD. The fourth chapter is a tutorial to use this distribution. The last chapter is a small presentation of the XtreemOS components included in this release, and instructions to activate them and start using them.

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Chapter 1

Packaging

This chapter discuss the packaging of the XtreemOS distribution, and give details about how to build the packages, and which packages are available.

1.1 Chroot

To avoid various problems of glibc, GCC and libraries compatibility between partners, because none of us use the same Linux Distribution, we provide an XtreemOS chroot based on Mandriva Linux 2008.0. All packages are built using this chroot, so each partners can easily rebuild a package, and can reproduce a build bug.

You can find more informations about this chroot in previous document *D4.1.1, Initial LinuxSSI integration and packaging in Debian, Mandriva and RedFlag distribution*.

1.2 SVN Repository

The sources of the packages are stored on the Inria Gforge SVN repository under the directory *WP4.1/packages/Mandriva/cooker*.

Each package has its own subdirectory containing 2 other subdirectories :

- *SPECS* for the spec file
- *SOURCES* for the sources and patchs

If you want to build one of the packages you can use the following commands :

```
$ svn co svn+ssh://scm.gforge.inria.fr/svn/xtreemos/WP4.1/
> packages/Mandriva/cooker/packagename
$ cd packagename
$ mkdir BUILD RPMS SRPMS
$ rpm --define "_topdir $PWD" -ba SPECS/packagename.spec
```

The resulting packages are stored in the *RPMS/i586* (if running on *i586*) directory. We move all the packages in a common directory and run the *genhdlist* command from *rpmtools* package in order to generate the hdlist. The directory can then be used as a software repository by *urpmi* or the installer when generating an *install-cd* or *live-cd*.

1.3 Currently available packages

A page on the wiki exists to list the status of the package of each XtreemOS component :
http://xtreemos.wiki.irisa.fr/tiki-index.php?page=XtreemOS+Packaging
This page also lists the known dependencies of each components, and the URL for downloading their sources.

Table 1.1: packages added or modified from a Mandriva 2008 release to create the XtreemOS release

Package name	WP	Doc	Layer
blcr-0.6.1	WP2.1	D1.2.3	XtreemOS-F
blcr-devel-0.6.1	WP2.1	D1.2.3	XtreemOS-F
blcr-libs-0.6.1	WP2.1	D1.2.3	XtreemOS-F
blcr-modules_2.6.20.16_krg2.1.1_2mdv-0.6.1	WP2.1	D1.2.3	XtreemOS-F / Linux-XOS
blcr-testsuite-0.6.1	WP2.1	D1.2.3	XtreemOS-F
daemonize-1.5.1			
dolly-0.57			
dolly_plus-0.93			
ka-deploy-server-host-0.92			
ka-deploy-source-node-0.92			
kernel-kerrighed-2.6.20.16-krg2.1.1-2mdv-1	WP2.2	D2.2.7	XtreemOS-F / LinuxSSI-XOS
kernel-kerrighed-devel-2.6.20.16-krg2.1.1-2mdv-1	WP2.2	D2.2.7	XtreemOS-F / LinuxSSI-XOS
kernel-kerrighed-devel-latest-2.6.20.16	WP2.2	D2.2.7	XtreemOS-F / LinuxSSI-XOS
kernel-kerrighed-latest-2.6.20.16	WP2.2	D2.2.7	XtreemOS-F / LinuxSSI-XOS
kernel-kerrighed-source-2.6.20.16-krg2.1.1-2mdv-1	WP2.2	D2.2.7	XtreemOS-F / LinuxSSI-XOS
kernel-kerrighed-source-latest-2.6.20.16	WP2.2	D2.2.7	XtreemOS-F / LinuxSSI-XOS
kerrighed-2.1.1	WP2.2	D2.2.7	XtreemOS-F / LinuxSSI-XOS
kerrighed-kernel-2.1.1	WP2.2	D2.2.7	XtreemOS-F / LinuxSSI-XOS
kerrighed-utils-2.1.1	WP2.2	D2.2.7	XtreemOS-F / LinuxSSI-XOS
keyutils-1.2			

Continued on next page

Table 1.1 – continued from previous page

Package name	WP	Doc	Layer
libjson-c0-0.7			
libjson-c0-static-devel-0.7			
libjson-c-devel-0.7			
libkerrighed-2.1.1	WP2.2	D2.2.7	XtreemOS-F / LinuxSSI-XOS
libkerrighed-devel-2.1.1	WP2.2	D2.2.7	XtreemOS-F / LinuxSSI-XOS
libkeyutils1-1.2			
libkeyutils-devel-1.2			
libkeyutils-static-devel-1.2			
libsaga0-0.7	WP3.1	D3.1.3	XtreemOS-G
libsaga-devel-0.7	WP3.1	D3.1.3	XtreemOS-G
libtaktuk0-3.5.2			
libtaktuk0-devel-3.5.2			
libxos0-0.04	WP2.1	D2.1.2	XtreemOS-F
libxos-devel-0.04	WP2.1	D2.1.2	XtreemOS-F
libxos-static-devel-0.04	WP2.1	D2.1.2	XtreemOS-F
nss_xos-0.04	WP2.1	D2.1.2	XtreemOS-F
pam_xos-0.04	WP2.1	D2.1.2	XtreemOS-F
perl-taktuk-3.5.2			
remotetea-1.0.6			
taktuk-3.5.2			
xtreemfs-client-0.0.1	WP3.4	D3.4.2	XtreemOS-G
xtreemfs-deps-0.0.1	WP3.4	D3.4.2	XtreemOS-G
xtreemfs-server-0.0.1	WP3.4	D3.4.2	XtreemOS-G
xtreemos-node_management-0.0.1	WP3.2		XtreemOS-G
xtreemos-nss-pam-0.04	WP2.1	D2.1.2	XtreemOS-F
xtreemos-nss-pam-conf-0.04	WP2.1	D2.1.2	XtreemOS-F
xtreemos-openssh-0.04	WP2.1	D2.1.2	XtreemOS-F
xtreemos-openssh-askpass-common-0.04	WP2.1	D2.1.2	XtreemOS-F
xtreemos-openssh-clients-0.04	WP2.1	D2.1.2	XtreemOS-F
xtreemos-openssh-server-0.04	WP2.1	D2.1.2	XtreemOS-F

1.4 Debian Packages

The XtreemOS Linux distribution is based on Mandriva 2008 (for this prototype release), so the packages can be used on a regular Mandriva 2008 distribution. RedFlag is responsible for testing and adapting the RPM packages on its RPM-based Linux distribution, RedFlag Linux.

XtreemOS should also work on Debian based Linux distributions. Debian packages made by Jean Parpaillon are available for Kerrighed from the Kerrighed web site on http://www.kerrighed.org/.

1.4.1 Building the packages

If you want to build the packages, you can download the original linux sources, and a patch that add the kerrighed patch and debian package configuration and build script files.

```
$ wget http://kerrighed.gforge.inria.fr/debian/pool/main/
> l/linux-krg/linux-krg_2.6.20~krg2.1.1.orig.tar.gz
$ wget http://kerrighed.gforge.inria.fr/debian/pool/main/
> l/linux-krg/linux-krg_2.6.20~krg2.1.1-1.diff.gz
```

Extract the archive, and apply the patch :

```
$ tar xvf linux-krg_2.6.20~krg2.1.1.orig.tar.gz
$ cd linux-2.6.20
$ zcat ../linux-krg_2.6.20~krg2.1.1-1.diff.gz | patch -p1
```

After applying the patch, a *debian* directory should be present containing various patchs, build scripts, and package informations.

Now you can build the package using the *debuild* command in the source directory :

```
$ debuild
```

The same operation can be done for other Kerrighed packages.

1.4.2 Using Alien to install RPM packages

Native debian packages are available for Kerrighed, but there is no debian package for all the XtreemOS components. For theses components that don't have a debian package, it is usually possible to install the RPM packages built for Mandriva, using *alien*.

For instance, *alien* can be used to install *XtreemFS* packages. First convert the *rpm* packages to *deb* using *alien* :

```
$ ls *.rpm
xtreemfs-client-0.0.1-2mdv2008.0.i586.rpm
xtreemfs-deps-0.0.1-2mdv2008.0.i586.rpm
xtreemfs-server-0.0.1-2mdv2008.0.i586.rpm
$ fakeroot alien *.rpm
xtreemfs-client_0.0.1-3_i386.deb generated
xtreemfs-deps_0.0.1-3_i386.deb generated
Warning: Skipping conversion of scripts in package
  xtreemfs-server: postinst postrm preinst prerm
Warning: Use the --scripts parameter to include the scripts.
xtreemfs-server_0.0.1-3_i386.deb generated
```

Now you can install the *deb* packages which have been generated :

```
$ sudo dpkg -i xtreemfs-deps_0.0.1-3_i386.deb
Selecting previously deselected package xtreemfs-deps.
(Reading database ... 29470 files and directories currently
  installed.)
Unpacking xtreemfs-deps (from xtreemfs-deps_0.0.1-3_i386.deb) ...
Setting up xtreemfs-deps (0.0.1-3) ...
$ sudo dpkg -i xtreemfs-client_0.0.1-3_i386.deb
Selecting previously deselected package xtreemfs-client.
(Reading database ... 29477 files and directories currently
  installed.)
Unpacking xtreemfs-client (from xtreemfs-client_0.0.1-3_i386.deb) ...
Setting up xtreemfs-client (0.0.1-3) ...
$ sudo dpkg -i xtreemfs-server_0.0.1-3_i386.deb
Selecting previously deselected package xtreemfs-server.
(Reading database ... 29486 files and directories currently
  installed.)
Unpacking xtreemfs-server (from xtreemfs-server_0.0.1-3_i386.deb) ...
Setting up xtreemfs-server (0.0.1-3) ...
```

1.4.3 Limitations of alien

alien is a nice tool to install *rpm* packages on Debian, and works very well for simple packages that respect the LSB specifications, however when using more complexes packages that integrate better in the system, it has some limitations compared to native packages :

- Dependencies are not handled. For instance the xtreemfs-server package needs the files from the xtreemfs-deps package to be working, but the generated xtreemfs-server debian package does not have a dependency on xtreemfs-deps package.
- Pre/Post install and uninstall scripts are not converted by default. They can be converted, but are not always compatible.
- Binaries can be linked to libraries versions which are not available on an other distribution, or a version which is not binary compatible. For instance a binary could be linked to *libfoo.so.3* while the Debian release used only have *libfoo.so.2*. Packages need to be build on a system which has similar (or binary compatible) versions of libraries.
- Generated packages do not always follow the Debian policies. Which means that some files can be installed in an incorrect path.
- The init scripts may need to be adapted in order to work on other distributions

Considering these important limitations it will be necessary to find an other solution if we want to provide Debian packages for all XtreemOS components that are well integrated in the system. There are (at least) two possibilities :

- Provide full Debian integration by creating native Debian packages for all XtreemOS components
- Use a tool to convert RPM source packages to Debian source packages that will be rebuilt on the corresponding Debian distribution. To our knowledge, no such tool exist yet.

Chapter 2

Making the Live-CD

This Chapter is about the creation of the bootable Live-CD version of the XtreemOS Linux distribution. It explains the steps to create such a bootable CD, the tools used and their configuration.

2.1 Building the Live-CD

2.1.1 Description

To be able to test XtreemOS more easily, a Live-CD is built based on the XtreemOS Linux distribution. Draklive is used to build a live distribution according to a configuration file, create a master image, and optionally install it on a device. We use unionfs which allows transparent filesystem overlay (and makes possible file removal). The kernel used is the official Linux kernel with *kerrighed* and *unionfs* patches. The Kerrighed kernel module is included in the distribution, however it is not loaded automatically, so you can decide whether you want to use it or not, depending on whether you want to test LinuxSSI-XOS or LinuxSSI. Hardware detection is done with harddrake, providing a reliable integration.

Draklive is the tool that we use to build the LiveCD. You can find more information about it and how to download it on this page : http://wiki.mandriva.com/en/Draklive

2.1.2 Requirements

You must use a Mandriva Linux distribution to create this Live-CD, currently we use the latest stable release, the Mandriva Linux 2008 distribution. Some packages must be installed: squashfs-tools, syslinux, mkisofs, rsync and mtools.

To get the draklive source and draklive's configurations files, checkout them from the gforge subversion repositery:

```
$ svn co svn+ssh://USER@scm.gforge.inria.fr/svn/xtreemos/WP4.1/
> build-xos-distribution/livecd
```

2.1.3 Configuration

Draklive use 3 configuration files as describe below.

setting.cfg

The main configuration file is *config/settings.cfg*.

```
xtreemos@dhcp147 live-config]# cat config/settings.cfg
repository=/mnt/ken/dis/2008.0
additional_repository=http://192.168.100.147/xos
arch=i586
desktop=GNOME
media=cdrom
region=int
pack=
name=xos-linux
product=one
commercial=0
default_user=guest
```

1. **repositery** : path to the installer repository
2. **additional_repository** : where to find the XtreemOS bundle repository
3. **arch** : which arch to use
4. **desktop** : not used there
5. **media** : which media we want to create (usb or cdrom)
6. **region** : select languages (here international)
7. **name** : the name of the Live-CD
8. **commercial** : this option is used to define whether we want to include proprietary software
9. **default_user** : *guest* will be the default user

live.cfg

This is the Live-CD configuration file. It used **config/setting.cfg** to read the basic configuration (arch, repositery etc...). Then there are a lot of sections to define languages, files, modules options, package to install, etc...

- **langs_always** : default selected language
- **files** : if you want to add more files which are not present on a package

- **remove_files** : remove file from the Live-CD chroot
- **module_options** : specify an option for a module
- **exclude_modules** : exclude a module from the initrd image
- **additional_modules** : add a specific module in the initrd
- **patches** : patch chroot files
- **erase_rpms** : remove a package from the chroot
- **disable_services** : disable a service on the Live-CD
- **vga_mode** : choose the VGA mode
- **initrd_post** : do specific option on the initrd
- **regions** : which languages will be available on the Live-CD

auto_inst.cfg.pl

The automated installation feature of DrakX is controlled by the contents of a file named **auto_inst.cfg.pl**. The contents of the auto_inst.cfg file are comprised of a Perl Scalar Structure declaration (o). The declaration $o = ...; is used by the DrakX program to preset various options and selections. Within the opening/closing braces are a series of simple and/or compound declarations (representing your selections).

- **media**: define the media which contains the RPMS
- **rpmsrate_flags_chosen**: choose which weight (1 to 5) for each categories of packages should be selected
- **skipped_packages**: which package should not be installed
- **default_packages**: which packages will be installed
- **security**: this option is used to set the Mandrake Security Level
- **users**: add a specific user to your system
- **locale**: this option allows you to select the locale used for text presentations. The default is English US (en_US).
- **authentication**: this option is used to specify how user logins are authenticated
- **superuser**: set the Super User log in

- **keyboard**: specify the type of keyboard you are using by specifying one of the country codes.
- **timezone**: set the Time zone for the computer and to indicate if the computers hardware clock is set to UTC (GMT) or not
- **excludedocs**: exclude or include the package documentation
- **postInstall**: simple method to perform action at the end of the installation
- **autoExitInstall**: automatically exit the installation process
- **keep_unrequested_dependencies**: keep package without any dependencies

2.1.4 patch

net_create_ifcfg.ne2k.patch

This patch fixes a **ne2k** bug.

halt-live.patch

This patch fixes the **halt** process on the Live-CD.

2.1.5 files

kerrighed_nodes

This is a default configuration file for kerrighed.

test_blcr

Binary to test **blcr**, run, checkpoint an application, stop it, and re-run the process.

mandriva-live.modprobe.cdrom

A list of default modules to probe for the Live-CD.

2.1.6 Making the Live-CD

Draklive command take various arguments. Just run *draklive –help* to see all of them.

Most important ones are:

- **–clean** : clean installation chroot and work directory
- **–all** : run all steps, from installation to mastering

- **–config** : makes draklive use the next argument as a configuration file. This file should contain a hash describing the live distribution, meaning the system (chroot and boot), media (usb, cdrom, nfs) and mount type (simple R/W union, union with squash files).

To clean the old Live-CD build, run draklive with the **–clean** argument.

```
$ ../draklive/draklive --clean --config config/live.cfg
loaded config/live.cfg as config file
[...]
```

Now we can create the Live-CD, with the **–all** argument, all step will be entered.

```
$ ../draklive/draklive --all --config config/live.cfg
loaded config/live.cfg as config file
=== proceeding with region "int"
* entering step "install"
[...]
```

Chapter 3

Making the installation CD

3.1 MKCD

The main goal of this chapter is to explain how to build an XtreemOS Linux distribution. Mandriva uses a tool called MKCD : the Mandriva Linux Disc maker. This tool has been used since 2004, and all Mandriva's product since then have been released using this tools. Releasing a product is a complex task, because various parameters have to be taken into account: the installer and the kernel used, dependencies and conflict between packages, the list of packages which must be installed to get a usable system...

To be able to create this prototype XtreemOS distribution, we used the latest stable Mandriva product, Mandriva Linux 2008.0, and added the XtreemOS bundle. All unneeded software have been removed, for instance sound applications.

The first step is to install Mandriva Linux 2008.0, and install the MKCD package.

MKCD uses a main configuration file to define the name of the distribution, packages to include, and which installer to use.

MKCD is a very complex tools, with a lot of features, so we will not explain the whole use of them, but if you want to know more, an MKCD help exists for each function. Use them with care, because there is a lot of interaction between those functions, and you can easily break the process to build the Distribution.

```
mkcd -h installation
mkcd -h generic
mkcd -h boot
mkcd -h disc
mkcd -h list
mkcd -h dir
mkcd -h rpmlist
```

3.2 Get XtreemOS MKCD configuration

To get the MKCD configuration file, just check it out from the INRIA's gforge subversion XtreemOS tree.

```
$ svn co svn+ssh://USER@scm.gforge.inria.fr/svn/xtreemos/
> WP4.1/build-xos-distribution
```

Now you have all MKCD's configuration files, and a script to build the XtreemOS ISO.

3.3 MKCD configuration

In your home directory you have checkout various directories.

- **input** : MKCD list of packages
- **log** : all logs of the build
- **pieces** : RPM repositery, extra files
- **build** : path to store CDROM, ISO will be built from there
- **iso** : generated ISO

3.3.1 xos.conf

MKCD needs a main configuration file which describes how to make the CD. Let's see the content of the **xos.conf**:

```
XtreemOS

VERSION=XtreemOS
TAG=snap
BRANCH=devel
INPUT=/home/xtreemos/Build/input
PIECES=/home/xtreemos/Build/pieces
CDSIZE=700M

list 1 -k $PIECES/key/pubkey_main \
    $INPUT/all
rpmlist -b $PIECES/2008.0/i586
rpmlist -b $PIECES/2008.0/addon
rpmlist -b $PIECES/xos
```

```
################################################
#                                              #
#                 XOS CD                       #
#                                              #
################################################

# basesystem CD
disc 1 700M XOS-CD ``XtreemOS Linux Installer'' ``XOS-disc'' -v \
 ``XtreemOS Linux - 2008 (i586)'' -p Mandriva
dir main i586/media/main
generic --synthesis main 1

installation --askmedia --type basic --version $VERSION --branch \
 $BRANCH --arch i586 --minor 0 --subversion 1 --product private -o \
 50,3,0.1 -t $TAG --synthesis -c $PIECES/compssUsers.pl \
 -r $PIECES/rpmsrate -l en,it,fr,de,es,pt,pt_BR -i /export -d 1/main

boot --isolinux --theme Mandriva-Free -b i586/isolinux/isolinux.bin  \
 -f --dest i586/isolinux --first /export/isolinux -f --dest \
 i586/install/images /export/install/images
```

Explanation of the basic tag in the **xos.conf** configuration file:

- **XtreemOS** : name of the cdrom
- **list 1 -k $PIECES/key/pubkey_main** : define list number X, and use this key for rpm checksig, and last arg are the list of the rpm
- **rpmlist -b path_to_RPM** : path to RPMS, you can put more than one directory
- **rpmlist -s path_to_SRPM** : path to SRPMS
- **disc X size cdrom_name "arch" "label" -v volume_name -p publisher** : define disc number X, with a size (ie: 700m, 4.4g)
- **dir main i586/media/main** : create an alias name main to the directory i586/media/main
- **generic –synthesis rpms X** : create a synthesis hdlists number X for RPMS in i586/media/main. X is the number of the list

Two tags are more complex, the **installation** one and the **boot** one.

Installation tag explaination

- **installation** : this disc is an install CDROM
- **–branch $BRANCH** : define the branch
- **–version** : define the version
- **–arch i586** : specify the architecture (i586 or x86_64)
- **–nosrcfit** : do not stop if sources discs are full
- **–synthesis** : synthesis will be present
- **-l en,it,fr,de,es,pt,pt_BR** : language on CDROM will be en,it,fr,de....
- **-t $TAG** : tag added to the VERSION file
- **d 1/main** : select RPMS directory to take into account. 1 is a reference to Disc 1, and main a reference to the name of the directory on Disc 1
- **-r $PIECES/rpmsrate** : specify a custom rpmsrate
- **-c $PIECES/compssUsers.pl** : specify a custom compssUsers.pl
- **-i /export** : use the installer available in **/export** directory

3.3.2 Log directory

MKCD can create verbose log. We store them in the log directory. It's very useful to create verbose log because it explains how discs were created, and why it rejects some RPMS/SRPMS. Use the **–verbose X** option where X can be something between 1 (less) and 10 (more).

Another log options is **–printdiscsfiles name**. It creates a file which contains all the RPMS available on each disc, and why some RPMS where not present on the disc. Use the printediscfile.cd before the .log to debug an MKCD bug.

3.3.3 Pieces directory

This directory contains various subdirectories. We use the Mandriva Linux 2008.0 as a base for the XtreemOS Linux distribution. We add more packages needed in a directory called **addon**, and finally we use a directory **xos** with all XtreemOS package.

3.3.4 Build directory

It contains all files needed to build ISO.

3.4 Build the CD

Now you know how to modify the MKCD's configuration in case of trouble. It's time to build the ISO, to be able to test it, and check the content. MKCD takes some arguments from the command line. In our case, we just want to create an XtreemOS Linux Distribution CDROM with log to be able to check why a package was present or was rejected.

Example of an MKCD's command line:

```
$ mkcd --nofork --missing-non-fatal --verbose 10 --printdiscsfiles \
> log/xos.cd -s xos.conf -m 1  > log/xos.log 2>&1
```

Most used MKCD's options are:

- **–printdiscsfiles name_file** : print the content of each disc into name_file (included and rejected packages)
- **–noiso** : do not create iso images of the discs
- **–verbose X** : print more messages (the higher the more, 10 is the higher)
- **-s xos.conf**: xos.conf MKCD's configuration file
- **-m 1** : build the disc number 1

Chapter 4

XtreemOS Linux distribution tutorial

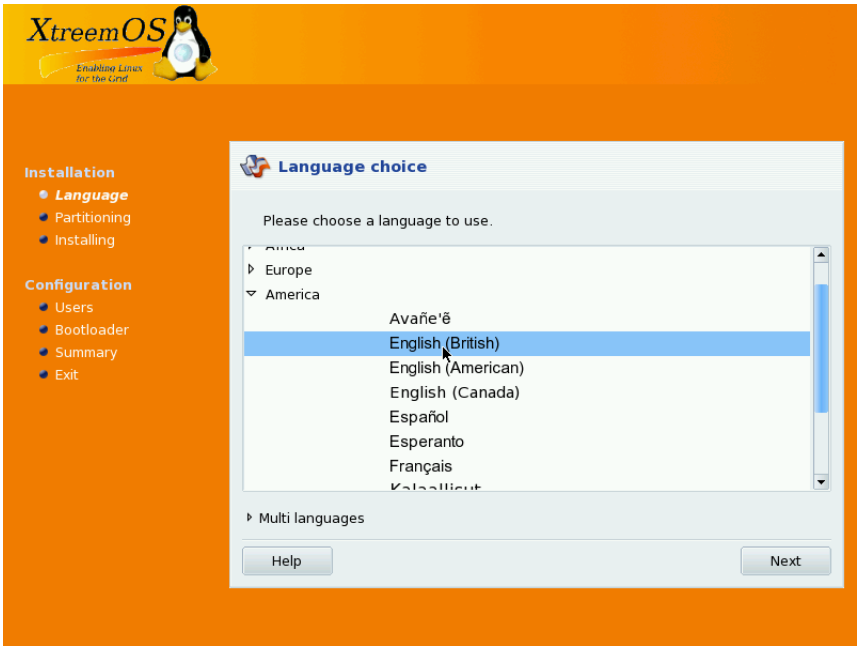
This chapter is a short tutorial of the XtreemOS Linux distribution. Two versions are available :

- An installable version
- A Live-CD version that can be run from the CDROM

Both versions provide the same software.

4.1 XtreemOS Linux Installation

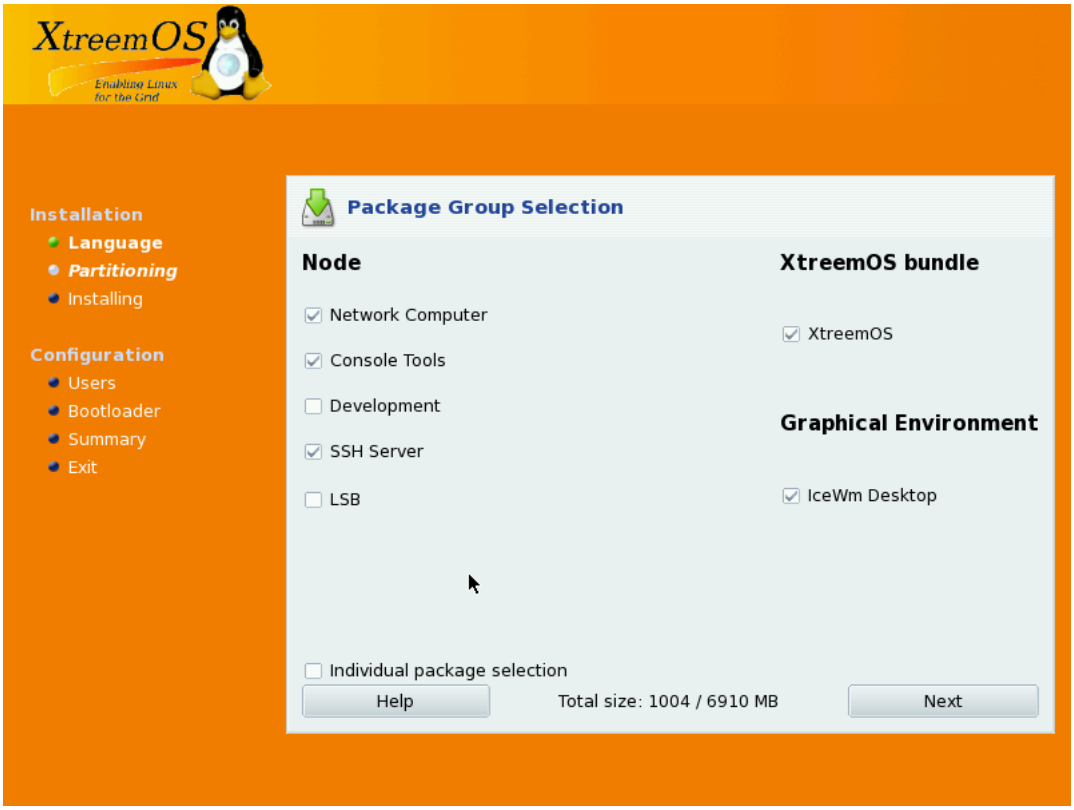
4.1.1 XtreemOS Linux installer

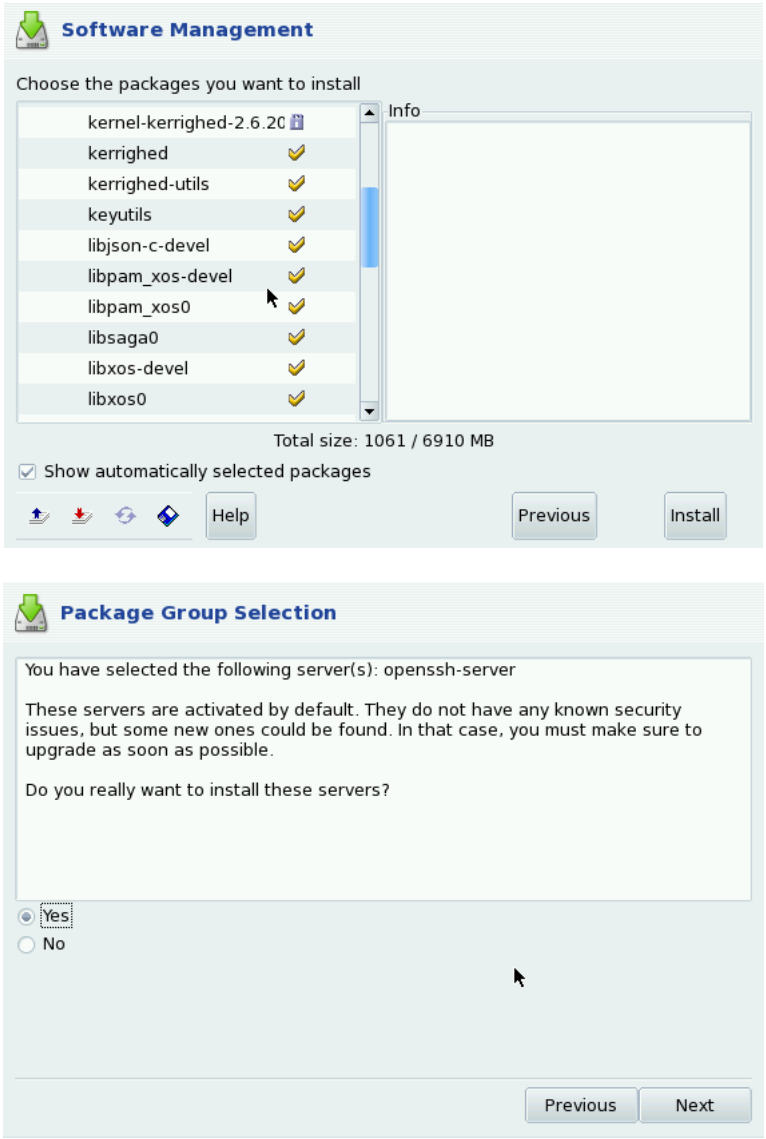


The XtreemOS Linux installer is based on Mandriva 2008.0 installer. You can refer to the online Mandriva 2008 documentation if you need more details about the install procedure : http://club.mandriva.com/xwiki/documentation/Starter.en.html/install.html

4.1.2 Package group selection

After the language selection, hardware detection, language and keyboard selection and partitioning steps we enter the software package installation itself. It consists of selecting the installation media and the packages to be installed. By default the **XtreemOS bundle** is selected.

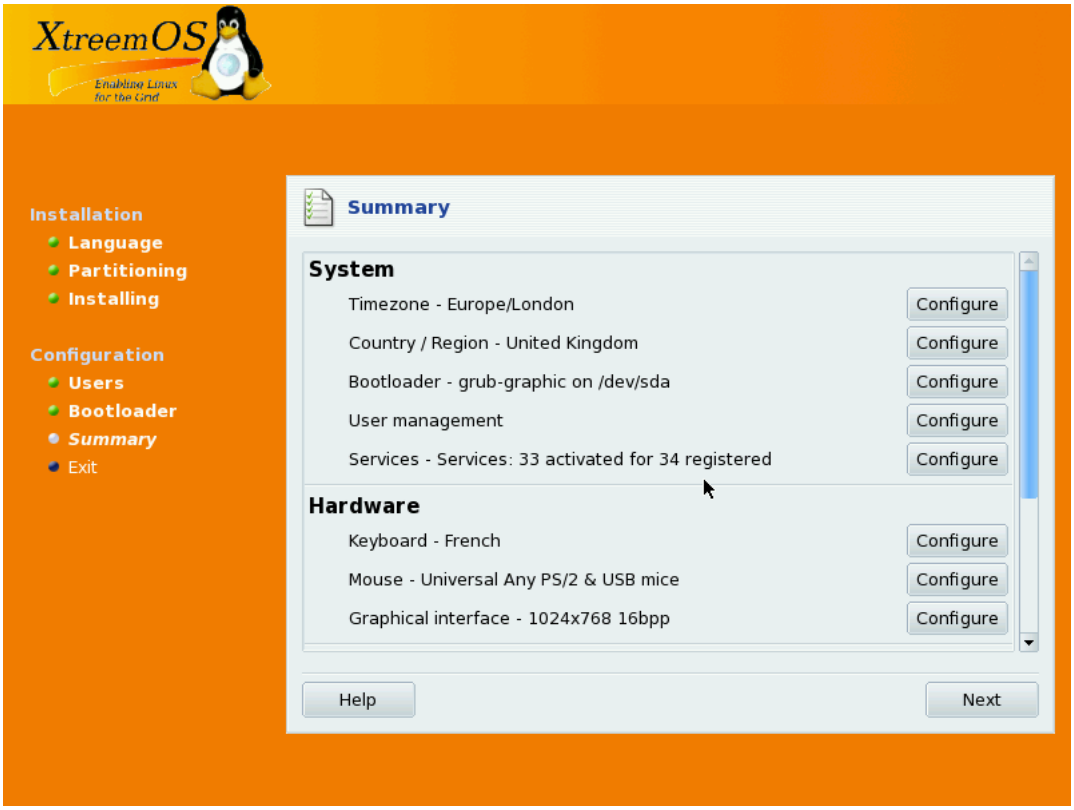



Software Management
Choose the packages you want to install
kernel-kerrighed-2.6.20
kerrighed
kerrighed-utils
keyutils
libjson-c-devel
libpam_xos-devel
libpam_xos0
libsaga0
libxos-devel
libxos0
Info
Total size: 1061 / 6910 MB
Show automatically selected packages
Help
Previous
Install
Package Group Selection
You have selected the following server(s): openssh-server
These servers are activated by default. They do not have any known security issues, but some new ones could be found. In that case, you must make sure to upgrade as soon as possible.
Do you really want to install these servers?
Yes
No
Previous
Next

4.1.3 Summary

At the end of the install, DrakX presents a summary of the informations it gathered about your system. After some quick configuration you are ready to reboot on your newly installed XtreemOS Linux distribution.

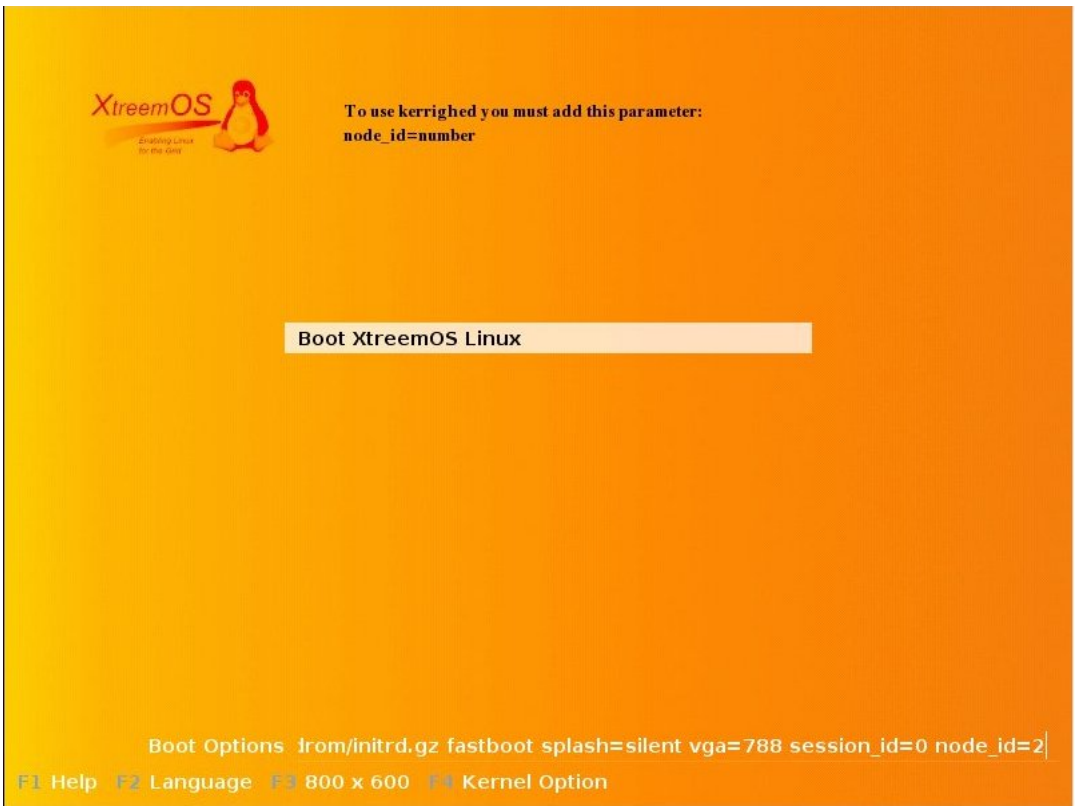
You can now follow the instructions in chapter 5 to start using the XtreemOS software included in this release.



4.2 Using the Live CD

The Live CD version includes the same XtreemOS components as the installable version. The advantage of this version is that you can use it without installation on the hard drive.

4.2.1 Select a *node_id*



Setup the bios to boot on your computer to boot on the CDROM first and you should see this boot prompt appear. If you want to use kerrighed, you need to select a different node_id for each node. Press *F3* to edit the options, and change the node_id.

4.2.2 Login screen

After booting the system you should be able to login as *guest* or *root*, without password. You are now ready to follow the instructions in chapter 5 to start using the XtreemOS software included in this release.

Chapter 5

Using the Software

This release of an XtreemOS Linux distribution includes some of the prototype software that have been developped in the XtreemOS project. This chapter describes the software included, and how to activate and start using them. It is assumed that the packages are installed, which should be the case if you follow the instructions in chapter 4. For more detailed informations about thoses software however, please refer to the corresponding documentation. Corresponding documentation number for each package is indicated in Table 1.1 in section 1.3.

5.1 Kerrighed

Linux with Kerrighed is the kernel used for the LinuxSSI-XOS flavor. The default Kernel used in this release of XtreemOS has been patched for Kerrighed. However the Kerrighed kernel module is not loaded automatically, and you can decide whether you want to use LinuxSSI-XOS (by loading the Kerrighed module) or LinuxSSI.

If you want to use Kerrighed, you need to set the node_id kernel parameter, with a different number for each node. Also a file */etc/kerrighed/kerrighed_nodes* should be created like this one:

```
session_id=1
node1:0:eth0
node2:0:eth0
node3:0:eth0
node4:0:eth0
.........
```

Check you have a *node_id* kernel parameter at boot:

```
root # cat /proc/cmdline
BOOT_IMAGE=linux root=/dev/sda5  resume=/dev/sda1 node_id=3
```

on all nodes probe the kerrighed module:

```
root # modprobe kerrighed
Start loading Kerrighed...
Init Kerrighed worker(s)...Init Kerrighed low-level framework...
Init kerrighed syscall mechanism
iluvatar - init module
TIPC: Started in network mode
TIPC: Own node address <1.1.4>, network identity 0
TIPC: Enabled bearer <eth:eth0>, discovery domain <1.1.0>, priority 10
RPC initialisation done
Init Kerrighed low-level framework (nodeid 3) : done
Init Kerrighed distributed services...
Ctnr initialisation : start
KDDM set init
KDDM set init : done
Ctnr initialisation done
KerMM initialisation : start
register_io_linker mem : buffer-based import/export is deprecated
KerMM initialisation done
DVFS initialisation : start
register_io_linker DVFS : buffer-based import/export is deprecated
FAF: initialisation : start
FAF: initialisation : done
DVFS initialisation done
KerIPC initialisation : start
register_io_linker shm: buffer-based import/export is deprecated
register_io_linker shmid: buffer-based import/export is deprecated
KerIPC initialisation done
Proc initialisation: start
Proc initialisation: done
EPM initialisation: start
EPM initialisation: done
Init Kerrighed distributed services: done
Kerrighed... loaded!
```

Now start kerrighed:

```
root # krgadm cluster start
No node specified... we're going to start all available nodes
we're going to start 3
```

5.2 blcr

BLCR is the Checkpoint/Restart mechanism used in the Linux-XOS flavor of XtreemOS-F.

If you want to use it, start the blcr service which will probe all needed modules:

```
root # /etc/rc.d/init.d/blcr start
```

Now you should find those lines in dmesg message:

```
vmadump: (from bproc-4.0.0pre8) Erik Hendriks <erik@hendriks.cx>
vmadump: Modified for blcr 0.6.1 <http://ftg.lbl.gov/checkpoint>
blcr: Berkeley Lab Checkpoint/Restart (BLCR) module version 0.6.1.
blcr: Supports BLCR kernel interface version 0.6.0.
blcr: http://ftg.lbl.gov/checkpoint
```

Go to */usr/lib/blcr-testsuite* directory and laucnh the *RUN_ME* script:

```
root@localhost blcr-testsuite]# ./RUN_ME
PASS: atomics
PASS: cr_run
Restart failed: Device or resource busy
FAIL: bug2003
PASS: stage0001.st
PASS: stage0002.st
PASS: stage0003.st
PASS: critical_sections.st
PASS: replace_cb.st
PASS: failed_cb.st
PASS: pid_in_use.st
...
```

5.3 XtreemFS

There are two main XtreemFS packages : *xtreemfs-server* for the server, and *xtreemfs-client* for the client.

5.3.1 xtreemfs-server

The XtreemFS server has 3 components :

- the directory server
- the object store server
- the metadata and replica manager

If they are enabled in */etc/sysconfig/xtreemfs-server* the components are started by running the following command as root :

```
root# service xtreemfs-server start
```

And stopped with the following command :

```
root# service xtreemfs-server stop
```

The Directory Server

Enable the directory server by adding the line *ENABLE_DS=yes* in */etc/sysconfig/xtreemfs-server*.

The default configuration file for this component is */etc/xtreemfs/dirconfig.properties*.

The Object Store Server

Enable the object store server by adding the line *ENABLE_OSD=yes* in */etc/sysconfig/xtreemfs-server*.

The default configuration file for this component is */etc/xtreemfs/osdconfig.properties*.

The Metadata and Replica Manager

Enable the metadata and replica manager by adding the line *ENABLE_MRC=yes* in */etc/sysconfig/xtreemfs-server*.

The default configuration file for this component is */etc/xtreemfs/mrcconfig.properties*.

5.3.2 xtreemfs-client

Once the xtreemfs server components are running, you can use the client to mount the filesystems. First you need to create a new volume, using the *mkvol* command. Use the following command to create the volume (replace *localhost* by the hostname of the mrc) :

```
$ mkvol http://localhost/MyVolume
```

Now you can mount the volume using the following command (on one line) :

```
$ xtreemfs -o \
volume_url=http://localhost:32636/MyVolume,direct_io \
~/mntpath
```

You can list the available volumes using the *lsvol* command :

```
$ lsvol http://localhost/
```

You can delete a volume using the rmvol command :

```
$ rmvol http://localhost/MyVolume
```

Some documentation about xtreemfs is also available in */usr/share/doc/xtreemfs-server/README*.

5.4 PAM/NSS

Some documentation is available in */usr/share/doc/xtreemos-nss-pam/README*.

After installing the packages, you need to enable the XtreemOS nss module in */etc/nsswitch.conf*. The *password* line should be something like this :

```
passwd:         compat
```

Replace it with something like this :

```
passwd:         compat xos
```

Then you need to enable the XtreemOS pam module for some programs, or all programs. If you want to enable XtreemOS authentication for the *su* program for instance, you have to edit */etc/pam.d/su*. The file should contain something like this :

```
#%PAM-1.0
auth       sufficient   pam_rootok.so
# Uncomment the following line to implicitly trust
# users in the "wheel" group.
#auth       sufficient   pam_wheel.so trust use_uid
# Uncomment the following line to require a user to
# be in the "wheel" group.
#auth       required     pam_wheel.so use_uid
auth       include      system-auth
account    include      system-auth
password   include      system-auth
session    optional     pam_xauth.so
session    include      system-auth
```

Now add the the folloming lines in this file :

```
auth       sufficient   pam_xos.so
session    sufficient   pam_xos.so
```

The edition of the pam and nss configuration is not done automatically by the pam_xos and nss_xos packages, to allow the user to define exactly how he wants to use the modules. However, this configuration will be done later by an XtreemOS meta-package, or an XtreemOS configuration tool.

5.5 XtreemOS SSH

An SSH client and server based on OpenSSH supporting the XtreemOS authentication is included. The commands are the same as openssh, with *-xos* appended.

5.6 Saga

Saga is an API for grid applications. The version 0.7 of Saga C++ implementation is included in this release. There are two packages, *libsaga* for the library itself, and *libsaga-devel* for the development files.

You can find some examples of programs using saga in the directory */usr/share/doc/libsaga/examples/*.

Chapter 6

Conclusion

In order to allow a maximum of people to use XtreemOS when it is released we will provide a full Linux distribution including all the XtreemOS components, integrated to allow a quick and easy setup. This release is a first prototype of this distribution. But we also need to provide packages so that people can use their favorite Linux distribution. However building packages for every Linux distribution available in the world is not easy and time consuming. For this reason we will provide packages for Mandriva (on which will be based the XtreemOS Linux distribution) and RedFlag will help us make sure the packages we make are portable, or can be ported to other RPM based distributions with only minimal changes. We also provide LinuxSSI packages for the OSCAR clustering system, which work on various Linux distributions. We also plan to provide Debian packages for all XtreemOS components, although we don't know yet how we will create them, if they will be written from scratch, or converted from rpm source packages. We also have to take into consideration the fact that SAP components can only be tested on a certified distribution, usually RedHat or Suse.

To conclude, we will provide an XtreemOS distribution, and packages for a few major Linux distributions, and expect the open source community to be involved in porting our packages to their favorite Linux distribution.