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# XtreemOS

Integrated Project

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

## Public release of XtreemOS 2.1 D4.1.24

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# Executive Summary

This document describes the improvements made to the latest XtreamOS 2.1.1 release. It is based on version 2.0 with updates, therefore the process is similar to what was described in the Deliverable D4.1.23. We will focus our explanation on the major enhancements introduced in the build process of the 2.1 release.

Thanks to the new BCD (Build CD) ISO creation application, we have sped up the capability to make current and future releases of XtreamOS, along with easing the addition of new packages to the XtreamOS install process. In addition, we have added support running for XtreamOS on XEN virtual machines. Lastly, we have new tools included to allow end users to create their own XtreamOS install images, customized for their requirements.

The main goal of the XtreamOS 2.1 release is to provide a full Linux Distribution with all XtreamOS components available, including all the latest stable updates since the release 2.0. The introduction of XEN will provide end users a new method for using and testing XtreamOS.

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# 1 Introduction

The XtreamOS consortium has designed, implemented and distributes an open source Grid operating system called XtreamOS) with native support for virtual organizations (VO). XtreamOS runs on a wide range of underlying hardware platforms, from clusters to mobiles.

This document presents the XtreamOS 2.1 Linux distribution based on XtreamOS 2.0 and Mandriva 2009.0. This Linux distribution is the third public release of XtreamOS and includes the large majority of XtreamOS components. The components not included are those which are not yet completed. It provides the Linux-XOS PC flavour, LinuxSSI-XOS (Single System Image/Cluster version, as well as some XtreamOS-Grid components. The consortium has worked consistently to refine the integration of XtreamOS components while the development process has implemented a host of improvements based on the user experience of the 2.0 release.

The first chapter introduces new features and debugging done in the BCD to create ISO's. The second is a quick summary about the subversion packages repository. The third chapter briefly explains the procedures and scripts used to manage the different versions of the software on the subversion repository. The fourth chapter describes the updated packages included with XtreamOS 2.1 and major changes. Finally, the last chapter describes the XEN system and how to use it with XtreamOS.

## 2 BuildCDTool

This section explains the new features developed and implemented in *BCD*, the software used to create XtremOS 2.1 installation CDs.

### 2.1 BCD

As described previously in D4.1.23, the BCD tool is a program to generate an ISO CD image based on a Mandriva Distribution. It has been completely rewritten to replace the old CD creation tool which had become, over time, increasingly difficult to maintain and use.

The most frequent issue with building the 2.0 release was finding better methods to use external updates and the backport media. Moreover, BCD had several issues and needed some improvements, along with the need to provide better and more accurate diagnostic output to assist debugging build issues.

#### 2.1.1 Improvements

This section will outline the major improvements added to the BCD tool. Using it in a production environment has allowed significant testing and improvements.

The first improvement was to use the *urpmq* (rpm query) tool instead of *urpmi* (rpm installer), this change fixed several bugs in dependencies and conflicts between packages. Moreover, using *urpmq* is easier and simplifies the code of BCD. An XtremOS DVD/CD contains more than 1300 packages, so using *urpmq* queries speeds the process of creating an ISO. Another improvement to speedup the process is improved configuration file parsing. For example, BCD ignores lines beginning with # and other comments. BCD now uses the Perl fork manager Libraries, so it can take advantage of multiple core CPU's

Earlier versions of BCD lacked checking the result of copying important files (*rpmsrate*, *filedeps*, *compssusers.pl*) and other steps (*isolinux*, and creation of *hdlists*). BCD can run an automatic daily check and export the results via a new web module, which can generate HTML output. Following images are a typical BCD's html output.

## XtreemOS-2.1.1-x86\_64 build at 2010\_4\_28-5h23-6

- Date of the synchronisation to the cooker repository: UNKNOWN date
- Configuration file used: [xos64.xml](#)
- Architecture: x86\_64
- Distribution based on: 2009.0
- Version: 2.1.1
- Theme used: Mandriva-Free

## Media list

### Media main

Name of the media: main  
Description: Main media  
From wich dir: main  
destination dir: main  
Pubkey: release/media\_info/pubkey

#### list of input file

- [input\\_main](#)
- [languages](#)

#### list of exclude file

- [exclude\\_main](#)

### Media contrib

Name of the media: contrib  
Description: Contrib media  
From wich dir: contrib  
destination dir: main  
Pubkey: release/media\_info/pubkey

#### list of input file

#### list of exclude file

- [exclude\\_contrib](#)

### Media xos

Name of the media: xos  
Description: xos media  
From wich dir: xtreemos  
destination dir: main  
Pubkey: release/media\_info/pubkey

#### list of input file

- [xos\\_list\\_64](#)

#### list of exclude file

- [exclude\\_main](#)
- [exclude\\_contrib](#)

## RPMCHECK Status

ERROR in RPMCHECK ! ERROR in RPMCHECK ! [rpmcheck directory](#) (rpmcheck --explain --failures)

## Link to URPMQ logs

[All log of URPMQ command per package/media](#) (based on: urpmq --requires-recursive -c --sources)

## Link to ISO, IDX, SHA1 and MD5

- No ISO available
- [XtreemOS-2.1.1-x86\\_64-2010\\_4\\_28-5h23-6.idx](#)

Another issue frequently encountered is the ensuring the correct kernel versions are included. XtreemOS has more than four kernel variants, with several subrevisions available in updates. BCD is now able to compare each kernel and keep the latest revision.

As explained in D4.1.23, the download repositories are split into subdirectories: Updates, Releases, Backport and Testing. BCD now supports external media with this structure, thus simplifying configuration files. In addition, there is no longer the need to create a list for each external media.

The implementation of checking duplicate packages on a media is very important. Having

several versions of the same package is not necessary and it wastes space on the final ISO. BCD is now able to check and compare versioning of the same package and keep the latest one. XtremOS uses a specific GPG signing key to authenticate package. BCD has an option to declare this key and use it to sign all packages available on the ISO.

Signing process example:

```
cdacclient-0.2.1-3xos2.0.i586.rpm (6/236)
cdacclient-debug-0.2.1-2xos2.0.i586.rpm (7/236)
cdacclient-0.2.9-1xos2.0.noarch.rpm (8/236)
cdaproxy-0.2.1-1xos2.0.i586.rpm (9/236)
cdaserver-0.2.4-1xos2.0.noarch.rpm (10/236)
cdaserver-jardeps-0.2.4-1xos2.0.noarch.rpm (11/236)
clusterscripts-client-3.2-2xos2.0.noarch.rpm (12/236)
clusterscripts-common-3.2-2xos2.0.noarch.rpm (13/236)
clusterscripts-server-3.2-2xos2.0.noarch.rpm (14/236)
cppcheck-1.37-1xos2.0.i586.rpm (15/236)
denyhosts-2.6-2xos2.0.noarch.rpm (16/236)
dietlibc-devel-0.32-4.20090113.3xos2.0.i586.rpm (17/236)
dixi-aem-node-0.2.24-1xos2.0.i586.rpm (18/236)
dixi-aem-server-0.2.24-1xos2.0.i586.rpm (19/236)
dixi-aemdemo-0.2.24-1xos2.0.i586.rpm (20/236)
```

BCD now can drop media before doing an *rpmcheck*; very useful if you do not need to re-run some *urpmq* queries with all media available.

### 2.1.2 Logging and Information

Good software tools need good documentation and when required, verbose logging output. The documentation of BCD is available in man, Latex and PDF format. Moreover, it explains all of the configuration file options, the current usage, along with a dedicated chapter which outlines, step by step, the ISO creation process.

To help end users debug their ISO creation, BCD needs to give better text output for its current status and should display more in depth data.

Therefore we add additional logging features:

- BCD now displays an error message if *rpmcheck* failed, explaining why there is an error in *hdlists*
- Logging shows which packages has been skipped while running the duplicate packages selection stage.
- The BCD running process is quite long, approximatively 20 minutes for a 3.8 GO ISO, so it displays the number of transaction required and the current progress in the ISO creation.

### 2.1.3 Fixes

BCD has been designed to create XtremOS ISOs. As BCD still is relatively new, there still remain some bugs. Below are the most important items to resolve or are in the process of resolution:



- We need to reset the public key of a media in the sub `media_info` directory to be sure we use the good one
- BCD does not use TAG anymore, because they are not required for a DVD release.
- A major fix has been applied in the skipping mode function to avoid removing essential packages.
- Finding the source and the destination media was previously broken, so packages were placed on the wrong media.
- Prior versions of the BCD step `'rpmcheck'` created two log files, where only one is needed.
- BCD greps the password only if the file exists, to avoid signing packages without a password.
- Rpmcheck is launched only if needed, such as the case when `hdlists` are corrupted.
- ISO names now conform to official LABEL name.

## 2.2 XtreamOS Configuration

As in the 2.0 release, we used two XML configuration files; one for each architecture (32 bits and 64bits). All necessary information and configuration files used to build ISO are available on the public subversion repository of XtreamOS:

*svn://scm.gforge.inria.fr/svn/xtreemos/distribution/build-xos-distribution*

## 2.3 Signing Packages

BCD is now able to sign RPM packages. The `rpm` manager must be configured to run GPG and find the correct key to sign RPMs. All this information is stored in the `rpmmacros` file in the home directory of the user. This information needs to be added in the BCD configuration file:

```
<signature>/home/xtreemos/.signature.gpg</signature>
<rpmrc>/home/xtreemos/.rpmrc</rpmrc>
```

### 3 Source Packages On SVN

As before, all packages released for XtremOS are stored in the subversion repository:

*svn+ssh://scm.gforge.inria.fr/svn/xtreemos/distribution/packages/2.0*

As XtremOS 2.1 is based on 2.0, all packages are stored in the same location. Please refer to D4.1.23 for more information about source packages on SVN. There are no major package changes since the prior 2.0 release.

## 4 Mirrors and Package Repositories

### 4.1 Package Repositories

While RPM packages can be installed manually using the `rpm` command, this requires users to manually install all the required dependencies as well. As with all modern rpm-based Linux distributions, XtremOS can use a number of different software applications to automatically resolve dependencies and ensure they are installed properly on the end user's system. A *repository* is a directory containing packages with a file containing a list of the packages and metadata about the packages: the list of files, descriptions, dependencies, etc... This is contained in the *hdlist* file and is generated via the *genhdlist2* command.

#### 4.1.1 Repositories for XtremOS 2.x Release

The packages repositories for release 2.0 and 2.1 are shared. Official repositories are handled directly by Mandriva Soft. They are stored at the same place of Mandriva repository and Mandriva products. All Mandriva's mirrors contains the XtremOS repository and XtremOS ISO in the *MandrivaLinux/devel/* directory. The available package repositories:

- *The Mandriva 2009.0 Repositories:* XtremOS 2.0 and 2.1 releases are based on Mandriva 2009.0. The base packages and any other additional software a user wishes to install can be installed from those repositories.
- *The XtremOS Release Repository:* This repository contains all the XtremOS packages as they were at the time of the initial XtremOS 2.0 release.
- *The XtremOS Updates Repository:* This repository contains packages which have been updated after the release 2.0. It contains only tested updates, applied to fix specific bugs. Packages are always QA tested before being uploaded in this repository. Users should be able to install all updates from this repository with no regressions.
- *The XtremOS Testing Repository:* This repository contains update candidates. The packages from this repository either have not been extensively tested or are in the process of QA testing by XtremOS developers. This repository is not recommended for use by normal end users. For this reason, the testing repository is added by default, but not enabled. Only developers or experienced testers should enable this repository. When the packages from this repository have been tested and confirmed to work they can be moved to the updates repository.

The release 2.0 was an installation ISO based on the packages from the *release* repository. Release 2.1 is an installation ISO based on the packages available in the *release* and the *updates* repositories, with the versions of the packages available at the time of the release.

#### 4.1.2 Installing a package from the testing repository

The XtremOS Testing repository is automatically added, but it is not enabled by default. The repository can be enabled, however doing so is not recommended to avoid blindly installing packages from this repository. The following commands can be used to install and query packages available from the testing repository.

The testing repository is by default named *XtremOS\_Testing*. Before running any of the following commands, the *hdlist* for the *XtremOS\_Testing* repository needs to be updated, with the following command :

```
# urpmi.update XtreamOS_Testing
```

The following commands can then be used :

- To list updates available from the testing repository, for the currently installed packages :

```
$ urpmq --auto-select --media XtreamOS_Testing
```

- To install all updates available from the testing repository, for the currently installed packages :

```
# urpmi --auto-select --searchmedia XtreamOS_Testing
```

- To list all packages available in the testing repository :

```
$ urpmq -y --media XtreamOS_Testing .
```

- To install a single package from the testing repository :

```
# urpmi --searchmedia XtreamOS_Testing packagename
```

### 4.1.3 Sources Packages

The packages repositories previously mentioned are repositories for the binary packages. They are available for both *i586* and *x86\_64*. For each repository there is a corresponding repository containing the source packages. The sources packages can be extracted and contain all the sources for building the software along with the necessary RPM instructions.

### 4.1.4 The media.cfg file

The file `media.cfg` is the file describing all the repositories and categories, while listing if they should be added by default or not. The `media.cfg` for XtreamOS lists the Mandriva 2009.0 repositories and the XtreamOS repositories. Running the following command will setup all the repositories required to run XtreamOS :

```
# urpmi.addmedia --distrib [MIRROR_URL]/MandrivaLinux/devel/xtreemos/2.0/
```

### 4.1.5 Selecting Download Mirrors Automatically

In the previous command line, the user needs to manually specify the mirror he wants to use. It is also possible to use `aria2` to automatically select the fastest mirror available :

```
# urpmi.addmedia --distrib --mirrorlist
```

This command will look at the file `/etc/product.id` to know which distribution we are running. On *XtreamOS 2.0 x86\_64*, this will contain :

```
$ cat /etc/product.id
vendor=XtreamOS,distribution=XtreamOS Linux,type=xtreemos,version=2.0,
branch=Official,release=1,arch=x86_64,product=Free
```

From this file, it will construct the url to load the list of mirrors available :

```
http://api.mandriva.com/mirrors/xtreemos.2.0.x86_64.list
```

This list is updated nightly via a script run on Mandriva servers to check the availability of the XtreamOS packages on the mirrors and remove unavailable mirrors, as well as, add newly available mirrors.

### 4.1.6 The XtremOS 3.0 Release

As the time of this writing the development for the 3rd release has started. The package repositories for the 2nd release are stored in directory *2.0*. Another directory, *3.0*, has been created to store the development packages for the new version, with repositories similar to the XtremOS 2.0 repositories.

### 4.1.7 Scripts for Managing Repositories

As we are often building new packages and adding them to various repositories, to save time and avoid mistakes, we have created scripts automating the task of moving packages, generating hdlists and finally removing previous versions of the packages, signing the new packages with gpg. The scripts also prepare an email to send to the developers mailing list to announce the new packages.

The following scripts are available :

- `move-noarchrpms-to-release-2`
- `move-noarchrpms-to-release-3`
- `move-noarchrpms-to-testing-2`
- `move-noarchrpms-to-testing-3`
- `move-noarchrpms-to-updates-2`
- `move-rpms-to-release-2`
- `move-rpms-to-release-3`
- `move-rpms-to-testing-2`
- `move-rpms-to-testing-3`
- `move-rpms-to-updates-2`
- `move-srpms-to-release-2`
- `move-srpms-to-release-3`
- `move-srpms-to-testing-2`
- `move-srpms-to-testing-3`
- `move-srpms-to-updates-2`

The number at the end of the script name indicate the version of XtremOS, 2.0 or 3.0.

For the previous release, we also had `move-noarchrpms-to-*` scripts, which have since been removed. They are no longer required as the `move-rpms-to-*` have been improved to detect whether the selected rpms are *noarch*.

## 4.2 The Mirroring System

All packages and install ISOs are stored on Mandriva worldwide mirrors. We use scripts to synchronize the XtremOS packages from our build machines to the primary Mandriva mirror, using rsync. This primary mirror and XtremOS repositories are then replicated to several other mirrors around the world.

## 5 Packages Updates For Release 2.1

The release 2.1 of XtremOS is an updated version of the 2.0 release. It uses the same base as the release 2.0, with several bug fixes in existing packages, and also a few new components. No major feature changes have been introduced in existing components to concentrate on stability improvements. Below are the major changes to the most critical packages.

The following components have been updated with bug fix versions:

- cdaclient : update to release 0.2.9 and fix missing requires
- dixi : add a better description and add the missing files, update to release 0.2.23
- linuxssi : release 2.4.4 and sync with latest Kerrighed kernel
- volife : remove symlink /usr/share/tomcat5/servers and update to release release 0.2.7
- srds : update to release 0.2.29
- xtremos-nss-pam : bump the version to 0.2.11 to fix the last tweak to xtremfs\_mnt
- xos-blcr : sync to latest kernel
- xtremfs : update to release 1.2.0
- xvoms : remove dependency on xtremfs-server, and update to release 0.2.9

The following main new components have been added:

- xosautoconfig : an XtremOS Automatic Configuration Tool (<https://gforge.inria.fr/scm/viewvc.php/grid>)
- cdaproxy : a CDA proxy Mobile Device functionality (<https://gforge.inria.fr/scm/viewvc.php/grid/mobile>)
- openturns : an Open source initiative to Treat Uncertainties, Risks Statistics in a structured industrial approach (<http://trac.openturns.org/>)
- mandriva replication tools : a tool based on drakx installer (stage1, rescue) to duplicate a node via ka or dolly method ([https://gforge.inria.fr/scm/viewvc.php/distribution/build-xos-distribution/replication\\_gi/?root=xtremos](https://gforge.inria.fr/scm/viewvc.php/distribution/build-xos-distribution/replication_gi/?root=xtremos))
- Xen : the basic tools for managing XEN virtual machines and Xen capable kernels (<http://www.xen.org/>)

## 6 XEN

The XEN hyper-visor is one of the leading open source solutions for virtualization. It offers an extensive feature set for virtualization of x86, x86\_64 architectures, thus and ideal platform for testing and debugging the XtreamOS Linux Distribution.



### 6.1 XEN Domain 0

On the XEN Domain 0, we have several requirements to enable using XEN. First requirement is install the XEN tools and a XEN enabled kernel.

```
[root@node35 ~]# urpmi kernel-xen xen-3.3.1
```

Then, we regenerate the initrd file:

```
[root@node35 ~]# mkinitrd -v \  
-f /boot/initrd-xen-2.6.27.21-xen-3.3.1-4mdv.img \  
2.6.27.21-xen-3.3.1-4mdv
```

Now reboot using the XEN kernel to activate XEN features.

```
Linux version 2.6.27.21-xen-3.3.1-4mdv (mandrake@n2.mandriva.com)  
(gcc version 4.3.2 (GCC) ) #1 SMP Thu May 21 02:48:26 EDT 2009  
Reserving virtual address space above 0xf5800000  
Xen-provided physical RAM map:  
Xen: 0000000000000000 - 00000000ee0a0000 (usable)  
Xen reported: 2392.248 MHz processor.  
xen_mem: Initialising balloon driver.  
Xen virtual console successfully installed as xvc0
```

### 6.2 The Guest Domain

We have created two files: a tar archive which contains the XEN root system, and a XEN guest image. Both of them can be modified. Below is a quick usage outline.

#### 6.2.1 The Tar Archive

The tar archive contains the XtreamOS 2.1 i586 release, only the basesystem and a few necessary applications. You have to create a partition and then mount it under a directory (ie: /xen). Finally, extract the file `xos2.1_i586_xen-3.3.1_20100409.tar.bz2` into the /xen partition. You can download the xen configuration and XEN images at this address: [http://212.85.147.169/xen\\_data/](http://212.85.147.169/xen_data/)

## 6.2.2 The XEN Image

First you must create a file system; format it, then install an Xos2.1 system in this image loop mounted in a directory. At the end unmount the directory. Your image is ready to be used.

```
[root@node35 ~]# dd if=/dev/zero of=xos.img bs=2M count=1024 seek=1024
[root@node35 ~]# mke2fs -F -j xos.img
[root@node35 ~]# mkdir /mnt/xen
[root@node35 ~]# mount -o loop xos.img /mnt/xen
[root@node35 ~]# urpmi --use-distrib "PATH/URL TO AN XOS2.1 DVD" \
--root /mnt/xen basesystem urpmi iproute2 xosconfig \
mandriva-release openssh-server rsync locales-en kernel-xen \
--auto --no-verify-rpm
[root@node35 ~]# cp -af /dev/* /mnt/xen/dev/
[root@node35 ~]# umount /mnt/xen
```

## 6.3 XEN domain 0

Starting the Xen service:

```
root@node35 ~]# /etc/rc.d/init.d/xend start
Starting xendRTNETLINK answers: Device or resource busy
mNothing to flush.
Waiting for peth0 to negotiate link...
```

Determining IP information for eth0... done.

## 6.4 Xen Configuration

- Adjust the configuration in `/etc/xen/auto/xos21` (The section is relative to the partition)

```
[root@node35 ~]# cat /etc/xen/auto/xos21\_n1
kernel = "/boot/xen"
ramdisk = "/boot/initrd-xen.img"
memory = 500
name = "xos21\_n1"
dhcp = "dhcp"
disk = [ 'phy:sda1,sda1,w', 'phy:sda6,sda5,w' ]
root = "/dev/sda5 ro"
vif = [ 'bridge=eth0' ]
#cpus = "0"
extra = "xencons=tty"
hostname = "xos\_n1"
```

- Reboot your Domain 0 with the xen kernel.
- Start the xen daemon service
- Ensure the `/xen` partition is not mounted.
- Start the xen guest:



```
[root@node35 ~]# xm create /etc/xen/auto/xos21\_n1
Using config file "/etc/xen/auto/xos21\_n1".
started domain xos21\_n1
```

```
[root@node35 ~]# xm list
Name           ID    Mem VCPUs      State   Time(s)
Domain-0       0    3394    4    r-----  132.2
xos21\_n1       2     500    1    r-----  14.5
```

```
[root@node35 ~]# xm console xos21\_n1
```

```
XOS Linux release 2.1 for i586
Kernel 2.6.27.21-xen-3.3.1-4mdv on an i686 / tty1
localhost login:
```

## 6.5 Xen Usage

Check the list of running xen guests:

```
[root@node35 ~]# xm list
Name           ID    Mem VCPUs      State   Time(s)
Domain-0       0    3394    4    r-----  136.0
xos21\_n1       2     500    1    -b-----  14.8
```

Check the system resource usage while Xen Guests are running:

```
[root@node35 ~]# xm top
```

```
xentop - 12:20:15   Xen 3.3.1
2 domains: 1 running, 1 blocked, 0 paused, 0 crashed, 0 dying, 0 shutdown
Mem: 4062720k total, 4027264k used, 35456k free    CPUs: 4 @ 2392MHz
      NAME  STATE  CPU(sec) CPU(%)  MEM(k) MEM(%)  MAXMEM(k) MAXMEM(%)
SSID
  Domain-0 -----r      137   0.0   3475456  85.5   no limit      n/
  0
  xos21\_n1 --b---      14   0.0   512000  12.6   512000      12.
  0
```

Save the domain state to restore later:

```
[root@node35 ~]# xm save xos21\_n1 xos2.1\_n1.chk
[root@node35 ~]# file xos2.1\_n1.chk
xos2.1\_n1.chk: Xen saved domain (name xos21\_n1) (on_poweroff destroy))
```

```
[root@node35 ~]# du xos2.1\_n1.chk
502M xos2.1\_n1.chk
```

```
[root@node35 ~]# xm list
Name           ID    Mem VCPUs      State   Time(s)
Domain-0       0    3394    4    r-----  151.6
[root@node35 ~]# xm restore xos2.1\_n1.chk
```

```
[root@node35 ~]# xm list
Name           ID    Mem  VCPUs    State    Time(s)
Domain-0       0   3394     4    r-----   160.8
xos21_n1       3    500     1    -b-----    0.0
```

Now we can shutdown the guest:

```
[root@node35 ~]# xm shutdown xos21_n1
```

There is no default root password. The network will be automatically configured using a dhcp request. SSH service is available on port 22 , a default user *guibo* has been created with the string "a" as password to be able to login. It's up to you to configure and install all other services, main goal of this image is to provide the XtremOS XEN base image, not a whole system with a graohic user interface.

## 7 Conclusion

The XtreamOS release 2.1 was released in 17 March 2010. It provides many improvements and bug fixes over 2.0. It also provides a new software tool to more rapidly configure all XtreamOS services and then deploy them over nodes. The latest release 2.1.1, was very recently released at the end of April. It includes the latest fixes, a few updates and improvements to have an up to date 2.X release.

## 8 Future Releases

Having a well tested and refined 2.1.1 release will be useful for the currently planned second XtreamOS Summer School. For the upcoming 3.0 release, we anticipate the improvements in the release procedures and the new BCD tool will enable the consortium to deliver releases more rapidly and eliminate delays from bug fixes to the ISO installer itself.

## 9 References

The BCD tool:

[http://svn.mandriva.com/cgi-bin/viewvc.cgi/soft/build\\_system/bcd/](http://svn.mandriva.com/cgi-bin/viewvc.cgi/soft/build_system/bcd/)

XtreamOS subversion repository:

<https://scm.gforge.inria.fr/svn/xtreemos>

An example XtreamOS download mirror:

[ftp://ftp.proxad.net/pub/Distributions\\_Linux/MandrivaLinux/devel/xtreemos](ftp://ftp.proxad.net/pub/Distributions_Linux/MandrivaLinux/devel/xtreemos)

All tools and scripts available to build the XtreamOS 2.1 release:

<svn+ssh://scm.gforge.inria.fr/svn/xtreemos/distribution/build-xos-distrib>

Mandriva packaging policies :

[http://wiki.mandriva.com/en/Policies#Packaging\\_Policies](http://wiki.mandriva.com/en/Policies#Packaging_Policies)

XtreamOS packages on Doc4 Mandriva :

<http://doc4.mandriva.org/>

Xen

<http://xen.org/>

Xen full documentation

<http://tx.downloads.xensource.com/downloads/docs/user>