

LynxSecure 6.3.0 Open Source Software Guide

LynxSecure Release 6.3.0-rev16326



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Contents

PREFACE	vii
About this Guide	vii
Intended Audience	vii
For More Information	vii
Typographical Conventions	viii
Special Notes	ix
Technical Support	ix
Lynx Software Technologies, Inc. U.S. Headquarters	ix
Lynx Software Technologies, Inc. Europe	ix
CHAPTER 1 LYNXSECURE OPEN SOURCE DELIVERABLES	1
Precompiled Binaries	1
Standalone Source Components	1
Derived Source Components	1
LynxSecure Open Source Media	1
CHAPTER 2 GENERIC PC (x86_64)	3
Tools	3
Bootloader	3
LynxSecure Runtime Initialization Function (RIF)	4
LynxSecure Fully Virtualized Subject (FVS)	4
Picture in Picture Viewer Application	4
CHAPTER 3 XILINX ZYNQ ULTRASCALE+ MPSoC (AArch64)	5
Tools	5
LynxSecure Runtime Initialization Function (RIF)	5
LynxSecure Separation Kernel Hypervisor (SKH)	6
LynxSecure Fully Virtualized Subject (FVS)	6
LynxSecure Application Runtime (liblsa)	6
CHAPTER 4 NXP S32V234 MPSoC (AArch64)	7
Tools	7
Bootloader	7
LynxSecure Runtime Initialization Function (RIF)	8
LynxSecure Separation Kernel Hypervisor (SKH)	8
LynxSecure Fully Virtualized Subject (FVS)	8
LynxSecure Application Runtime (liblsa)	9
CHAPTER 5 CONFIGURING AND BUILDING STANDALONE OPEN SOURCE COMPONENTS	11
Building an Open Source Component	11
iPXE	12
SeaBIOS	12
U-Boot (NXP S32V234 MPSoC)	12

CHAPTER 6	CONFIGURING AND BUILDING BUILDROOT PROJECTS	13
	Projects	13
	Configure and Build	14
APPENDIX A	OPEN SOURCE LICENSES	15
	OpenBSD License	15
	BSD 2-Clause License	15
	BSD 3-Clause License	16
	ISC License	16
	GNU General Public License, Version 3	16
	GNU General Public License, Version 2	26
	GNU Lesser General Public License, Version 2.1	30
	GNU Lesser General Public License, Version 3	37
	OpenSSL Dual License	39
	Intel ACPI CA License	40
	QEMU NE2000 License	42
	QEMU AHCI License	42
	Pybench License	42
	Python-2.7.2 License	43
	Python-2.7.10 License	47
	OvmfPkg License	50
	Xilinx License	51

List of Tables

2-1. Tools Open Source Components.	3
2-2. Bootloader Open Source Components.	3
2-3. LynxSecure Runtime Initialization Function Open Source Components.	4
2-4. LynxSecure Fully Virtualized Subject Open Source Components.	4
2-5. Picture in Picture Viewer Application Open Source Components.	4
3-1. Tools Open Source Licenses.	5
3-2. LynxSecure Runtime Initialization Function Open Source Licenses	5
3-3. LynxSecure Separation Kernel Hypervisor Open Source Licenses	6
3-4. LynxSecure Fully Virtualized Subject Open Source Licenses.	6
3-5. LynxSecure Application Runtime Open Source Licenses	6
4-1. Tools Open Source Licenses.	7
4-2. Bootloader Open Source Components.	7
4-3. LynxSecure Runtime Initialization Function Open Source Licenses	8
4-4. LynxSecure Separation Kernel Hypervisor Open Source Licenses	8
4-5. LynxSecure Fully Virtualized Subject Open Source Licenses.	8
4-6. LynxSecure Application Runtime Open Source Licenses	9
5-1. List of Components	11
5-2. Make Targets	11
6-1. Supported Boards	13
6-2. Hardware Discovery Linux and Virtual Device Server buildroot project locations in the source tree.	13
6-3. Make Targets	14

Preface

About this Guide

The LynxSecure® contains some components that include code from the certain open source projects.

This guide, *LynxSecure Open Source Build Guide*, provides information about the open source components used in LynxSecure, including distribution policy, licensing and build process.

- Chapter 1, “*LynxSecure Open Source Deliverables*” (page 1) describes the distribution policy of the open source components media.
- Chapter 2, “*Generic PC (x86_64)*” (page 3) describes the open source components used in x86 version of LynxSecure.
- Chapter 3, “*Xilinx Zynq Ultrascale+ MPSoC (AArch64)*” (page 5) describes the open source components used in LynxSecure for Xilinx Zynq Ultrascale+ MPSoC.
- Chapter 4, “*NXP S32V234 MPSoC (AArch64)*” (page 7) describes the open source components used in LynxSecure for NXP S32V234 MPSoC.
- Chapter 5, “*Configuring and Building Standalone Open Source Components*” (page 11) describes the configuration and build procedures of the standalone open source components (shipped as a patch against the original source code).
- Chapter 6, “*Configuring and Building Buildroot Projects*” (page 13) describes the configuration and build procedures of the buildroot root projects.
- Appendix A, “*Open Source Licenses*” (page 15) provides a catalog of licenses.

Intended Audience

The information in this guide is designed and written for system integrators and software developers who will build applications on top of LynxSecure and have intention to modify the source of LynxSecure open source components.



NOTE: Basic understanding of Linux®/Unix®, the Linux kernel build processes, and familiarity with fairly complex configuration procedures is recommended.

For More Information

For more information on the features of LynxSecure, refer to the following printed and online documentation.

Development System Introduction

Provides a product overview along with information on key features, guest operating system support, and hardware support.

Basic Level Documentation

Release Notes

Contains important late-breaking information about the current release.

Configuration Guide

Provides details on the setup and installation of the LynxSecure® Development Kit along with important configuration procedures.

Advanced Level Documentation

Architecture Guide

Provides administrative information about the LynxSecure® architecture, key features and guest operating systems support.

Advanced Configuration Guide

Provides details on custom configuration features, manual editing of the configuration, and use of XML configuration tools.

API Guide

Provides details on all hypervisor calls and other interfaces that are available to various subjects.

Open Source Build Guide

Provides information about the build process for the LynxSecure® open source components.

Typographical Conventions

The typefaces used in this manual, summarized below, emphasize important concepts. All references to file names and commands are case sensitive and should be typed accurately.

Font and Description

Times New Roman 10 pt. - Used for body text; *italicized* for emphasis, new terms, and book titles.

Courier New 9 pt. - Used for environment variables, file names, functions, methods, options, parameter names, path names, commands, and computer data. Commands that need to be

Examples

Refer to the *LynxSecure User's Guide*

```
ls -l
myprog.c
/dev/null
login: myname
```


Font and Description	Examples
highlighted within body text, or commands that must be typed as-is by the user are bolded .	# cd /usr/home
Courier New Italic 9 pt. - Used for text that represents a variable, such as a file name or a value that must be entered by the user.	cat <i>filename</i> mv <i>file1 file2</i>
Courier New 7 pt. - Used for blocks of text that appear on the display screen after entering instructions or commands.	Kernel: target1.srp > Loading: target1.srp > > Booting
Univers 45 Light Bold 8 pt. - keyboard options, button names, and menu sequences.	Enter, Ctrl-C

Special Notes

The following notations highlight any key points and cautionary notes that may appear in this manual.



NOTE: These callouts note important or useful points in the text.



CAUTION! Used for situations that present minor hazards that may interfere with or threaten equipment/performance.

Technical Support

Lynx Software Technologies, Inc. Technical Support is available Monday through Friday (excluding holidays) between 8:00 AM and 5:00 PM Pacific Time (U.S. Headquarters) or between 9:00 AM and 6:00 PM Central European Time (Europe).

The Lynx Software Technologies, Inc. World Wide Web home page [<http://www.lynx.com>] provides additional information about our products.

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CHAPTER 1 *LynxSecure Open Source Deliverables*

Precompiled Binaries

Some of the standalone components are distributed in the form of a precompiled binaries.

You may have received the LynxSecure® open source media (page 1) with the original source code of such components as a part of the LynxSecure distribution.

Standalone Source Components

Standalone components are distributed in the form of a patch against the original version. The modified source code can be obtained by applying this patch to the original source code.

You may have received the LynxSecure open source media (page 1) with the original source code of such components as a part of the LynxSecure distribution.

Derived Source Components

For other LynxSecure product components, where required by the original license (such as derived buildroot projects used in the product), the source code used can be obtained by contacting Lynx Software Technologies, Inc. Technical Support.

LynxSecure Open Source Media

If permitted in your location, you may have received a separate media with the `lynxsecure-downloads` RPM. The `lynxsecure-downloads` RPM contains a collection of archives with the original source code for the open source components.

Installing this RPM is optional; if the open source component archives are not available, the build framework will attempt to download it from the Internet.

If Internet access is an issue, please contact Lynx Software Technologies, Inc. Technical Support for further instructions.



NOTE: For Lynx Safety Bundle 1.3, the `lynxsecure-downloads` RPM is packaged as part of the x86 and Arm® USA media.

Tools

Table 2-1: Tools Open Source Components.

Component	License	Compliance Deliverables
GNU Compiler Collection, GNU Binutils and GNU m4 (LSA toolchain)	section “GNU General Public License, Version 3” (page 16)	Contact Lynx Software Technologies, Inc. Technical Support for complete source code.
GNU Compiler Collection, GNU Binutils, GDB (Buildroot toolchain)	section “GNU General Public License, Version 3” (page 16)	Contact Lynx Software Technologies, Inc. Technical Support for complete source code.
uClibc (Buildroot toolchain)	section “GNU Lesser General Public License, Version 2.1” (page 30)	Contact Lynx Software Technologies, Inc. Technical Support for complete source code.
GNU make	section “GNU General Public License, Version 2” (page 26)	Contact Lynx Software Technologies, Inc. Technical Support for complete source code.
GNU EFI	section “BSD 2-Clause License” (page 15)	Patches against the original source code are provided as part of this release. Contact Lynx Software Technologies for complete source code.
Buildroot	section “GNU General Public License, Version 2” (page 26)	Patches against the original source code are provided as part of this release. Contact Lynx Software Technologies for complete source code.

Bootloader

Table 2-2: Bootloader Open Source Components.

Component	License	Compliance Deliverables
OpenSSL	section “OpenSSL Dual License” (page 39), section “OpenBSD License” (page 15)	Contact Lynx Software Technologies, Inc. Technical Support.

LynxSecure Runtime Initialization Function (RIF)

Table 2-3: LynxSecure Runtime Initialization Function Open Source Components.

Component	License	Compliance Deliverables
Intel ACPI CA	section “Intel ACPI CA License” (page 40)	Contact Lynx Software Technologies, Inc. Technical Support.

LynxSecure Fully Virtualized Subject (FVS)

Table 2-4: LynxSecure Fully Virtualized Subject Open Source Components.

Component	License	Deliverables
liblsa; uses multiple BSD-style licensed source files	section “OpenBSD License” (page 15)	Contact Lynx Software Technologies, Inc. Technical Support.
Virtual ACPI table generator; uses Intel's ACPI header files	section “Intel ACPI CA License” (page 40)	Contact Lynx Software Technologies, Inc. Technical Support.
SeaBIOS	section “GNU General Public License, Version 3” (page 16)	Contact Lynx Software Technologies, Inc. Technical Support.
Tianocore EDK II	<ul style="list-style-type: none"> section “BSD 2-Clause License” (page 15) section “Pybench License” (page 42) section “Python-2.7.2 License” (page 43) section “Python-2.7.10 License” (page 47) section “OvmfPkg License” (page 50) section “OpenSSL Dual License” (page 39) 	Patch against the original source code.
NE2000 emulation	section “QEMU NE2000 License” (page 42)	Contact Lynx Software Technologies, Inc. Technical Support.
AHCI emulation	section “QEMU AHCI License” (page 42)	Contact Lynx Software Technologies, Inc. Technical Support.

Picture in Picture Viewer Application

Table 2-5: Picture in Picture Viewer Application Open Source Components.

Component	License	Compliance Deliverables
Qt 5.6.1 Shared Libraries	section “GNU Lesser General Public License, Version 3” (page 37)	Contact Lynx Software Technologies, Inc. Technical Support.

Tools

Table 3-1: Tools Open Source Licenses.

Component	License	Compliance Deliverables
GNU Compiler Collection, GNU Binutils and GNU m4 (LSA toolchain)	section “GNU General Public License, Version 3” (page 16)	Contact Lynx Software Technologies, Inc. Technical Support for complete source code.
GNU Compiler Collection, GNU Binutils, GDB (Buildroot toolchain)	section “GNU General Public License, Version 3” (page 16)	Contact Lynx Software Technologies, Inc. Technical Support for complete source code.
uClibc (Buildroot toolchain)	section “GNU Lesser General Public License, Version 2.1” (page 30)	Contact Lynx Software Technologies, Inc. Technical Support for complete source code.
GNU make	section “GNU General Public License, Version 2” (page 26)	Contact Lynx Software Technologies, Inc. Technical Support for complete source code.
Devicetree Compiler	section “GNU General Public License, Version 2” (page 26)	Patches against the original source code are provided as part of this release. Contact Lynx Software Technologies for complete source code.
Buildroot	section “GNU General Public License, Version 2” (page 26)	Patches against the original source code are provided as part of this release. Contact Lynx Software Technologies for complete source code.

LynxSecure Runtime Initialization Function (RIF)

Table 3-2: LynxSecure Runtime Initialization Function Open Source Licenses

Component	License	Copyrights	Compliance Deliverables
libfdt	section “BSD 2-Clause License” (page 15)	Copyright (C) 2006,2012,2014 David Gibson, IBM Corporation. Copyright 2012 Kim Phillips, Freescale Semiconductor.	None; This license does not require disclosure of source code
Miscellaneous support code	section “BSD 3-Clause License” (page 16)	Copyright (c) 1991, 1993 The Regents of the University of California	None; This license does not require disclosure of source code

Component	License	Copyrights	Compliance Deliverables
Miscellaneous support code	section “BSD 2-Clause License” (page 15)	Copyright (c) 2013, 2014 Andrew Turner. Copyright (c) 2015 The FreeBSD Foundation.	None; This license does not require disclosure of source code
Miscellaneous support code	section “Xilinx License” (page 51)	Copyright (c) 2014 - 2018 Xilinx, Inc.	None; This license does not require disclosure of source code

LynxSecure Separation Kernel Hypervisor (SKH)

Table 3-3: LynxSecure Separation Kernel Hypervisor Open Source Licenses

Component	License	Copyrights	Compliance Deliverables
Miscellaneous support code	section “BSD 3-Clause License” (page 16)	Copyright (c) 1991, 1993 The Regents of the University of California	None; This license does not require disclosure of source code
Miscellaneous support code	section “BSD 2-Clause License” (page 15)	Copyright (c) 2013, 2014 Andrew Turner. Copyright (c) 2015 The FreeBSD Foundation.	None; This license does not require disclosure of source code
Miscellaneous support code	section “Xilinx License” (page 51)	Copyright (c) 2014 - 2018 Xilinx, Inc.	None; This license does not require disclosure of source code

LynxSecure Fully Virtualized Subject (FVS)

Table 3-4: LynxSecure Fully Virtualized Subject Open Source Licenses.

Component	License	Copyrights	Compliance Deliverables
libfdt	section “BSD 2-Clause License” (page 15)	Copyright (C) 2006,2012,2014 David Gibson, IBM Corporation. Copyright 2012 Kim Phillips, Freescale Semiconductor.	None; This license does not require disclosure of source code

LynxSecure Application Runtime (liblsa)

Table 3-5: LynxSecure Application Runtime Open Source Licenses

Component	License	Copyrights	Compliance Deliverables
Miscellaneous support code	section “BSD 3-Clause License” (page 16)	Copyright (c) 1982, 1986-1987, 1990, 1993 The Regents of the University of California. Copyright (c) 1995, 1996, 1997, and 1998 WIDE Project.	None; This license does not require disclosure of source code
Miscellaneous support code	section “ISC License” (page 16)	Copyright (c) 1996-1999, 2004 by Internet Systems Consortium, Inc.	None; This license does not require disclosure of source code

Tools

Table 4-1: Tools Open Source Licenses.

Component	License	Compliance Deliverables
GNU Compiler Collection, GNU Binutils and GNU m4 (LSA toolchain)	section “GNU General Public License, Version 3” (page 16)	Contact Lynx Software Technologies, Inc. Technical Support for complete source code.
GNU Compiler Collection, GNU Binutils, GDB (Buildroot toolchain)	section “GNU General Public License, Version 3” (page 16)	Contact Lynx Software Technologies, Inc. Technical Support for complete source code.
uClibc (Buildroot toolchain)	section “GNU Lesser General Public License, Version 2.1” (page 30)	Contact Lynx Software Technologies, Inc. Technical Support for complete source code.
GNU make	section “GNU General Public License, Version 2” (page 26)	Contact Lynx Software Technologies, Inc. Technical Support for complete source code.
Devicetree Compiler	section “GNU General Public License, Version 2” (page 26)	Patches against the original source code are provided as part of this release. Contact Lynx Software Technologies for complete source code.
Buildroot	section “GNU General Public License, Version 2” (page 26)	Patches against the original source code are provided as part of this release. Contact Lynx Software Technologies for complete source code.

Bootloader

Table 4-2: Bootloader Open Source Components.

Component	License	Compliance Deliverables
U-Boot	section “GNU General Public License, Version 2” (page 26)	Patches against the original source code are provided as part of this release. Contact Lynx Software Technologies for complete source code.

LynxSecure Runtime Initialization Function (RIF)

Table 4-3: LynxSecure Runtime Initialization Function Open Source Licenses

Component	License	Copyrights	Compliance Deliverables
libfdt	section “BSD 2-Clause License” (page 15)	Copyright (C) 2006,2012,2014 David Gibson, IBM Corporation. Copyright 2012 Kim Phillips, Freescale Semiconductor.	None; This license does not require disclosure of source code
Miscellaneous support code	section “BSD 3-Clause License” (page 16)	Copyright (c) 1991, 1993 The Regents of the University of California	None; This license does not require disclosure of source code
Miscellaneous support code	section “BSD 2-Clause License” (page 15)	Copyright (c) 2013, 2014 Andrew Turner. Copyright (c) 2015 The FreeBSD Foundation.	None; This license does not require disclosure of source code
Miscellaneous support code	section “Xilinx License” (page 51)	Copyright (c) 2014 - 2015 Xilinx, Inc.	None; This license does not require disclosure of source code

LynxSecure Separation Kernel Hypervisor (SKH)

Table 4-4: LynxSecure Separation Kernel Hypervisor Open Source Licenses

Component	License	Copyrights	Compliance Deliverables
Miscellaneous support code	Copyright (c) 1991, 1993 The Regents of the University of California	section “BSD 3-Clause License” (page 16)	None; This license does not require disclosure of source code
Miscellaneous support code	Copyright (c) 2013, 2014 Andrew Turner. Copyright (c) 2015 The FreeBSD Foundation.	section “BSD 2-Clause License” (page 15)	None; This license does not require disclosure of source code
Miscellaneous support code	Copyright (c) 2014 - 2015 Xilinx, Inc.	section “Xilinx License” (page 51)	None; This license does not require disclosure of source code. Note that this code is deactivated on this platform.

LynxSecure Fully Virtualized Subject (FVS)

Table 4-5: LynxSecure Fully Virtualized Subject Open Source Licenses.

Component	License	Copyrights	Compliance Deliverables
libfdt	section “BSD 2-Clause License” (page 15)	Copyright (C) 2006,2012,2014 David Gibson, IBM Corporation. Copyright 2012 Kim Phillips, Freescale Semiconductor.	None; This license does not require disclosure of source code

LynxSecure Application Runtime (liblsa)

Table 4-6: LynxSecure Application Runtime Open Source Licenses

Component	License	Copyrights	Compliance Deliverables
Miscellaneous support code	section “BSD 3-Clause License” (page 16)	Copyright (c) 1982, 1986-1987, 1990, 1993 The Regents of the University of California. Copyright (c) 1995, 1996, 1997, and 1998 WIDE Project.	None; This license does not require disclosure of source code
Miscellaneous support code	section “ISC License” (page 16)	Copyright (c) 1996-1999, 2004 by Internet Systems Consortium, Inc.	None; This license does not require disclosure of source code

Configuring and Building Standalone Open Source Components



NOTE: The project environment should be set before executing any of the build/configuration commands:

```
$ . SETUP.bash
```

The following open source components can be configured and built separately from the rest of the LynxSecure® components (paths are relative to the \$ENV_PREFIX directory):

Table 5-1: List of Components

Name	BUILD_NAME	MAKE_PATH	Output
iPXE	ipxe	subjects	x86_64/libexec/10ec8029.rom x86_64/libexec/8086100e.rom
SeaBIOS	seabios	subjects	x86_64/libexec/bios.bin
Tianocore EDK II	edk2	subjects	x86_64/libexec/OVMF.fd
GNU EFI	gnu-efi	tools/uefi	x86_64/include/efi x86_64/lib/uefi
DTC	dtc	tools	bin/dtc
U-Boot (NXP S32V234)	uboot-s32v234	bootloader	aarch64/libexec/u-boot-s32v234evb28899.s32 aarch64/libexec/u-boot-s32v234evb28899.bin aarch64/libexec/u-boot-s32v234evb29288.s32 aarch64/libexec/u-boot-s32v234evb29288.bin

Building an Open Source Component

The following command will execute the the make target for the open source component:

```
make -C MAKE_PATH MAKE_TARGET
```

Table 5-2: Make Targets

MAKE_TARGET	Description
prepare	Apply the patch to the original open source code. If the original source code is absent, download the original source code from the internet.
BUILD_NAME	Build a component; for the list of valid BUILD_NAME values refer to Table 5-1 (page 11).

<i>MAKE_TARGET</i>	Description
<i>BUILD_NAME</i> -dirclean	Remove component's build artifacts.
<i>BUILD_NAME</i> -menuconfig	Invoke ncurses-based configurator, if applicable to the component.
<i>BUILD_NAME</i> -update-config	Save configuration file, if applicable to the component.

iPXE

The default build configuration of the iPXE component builds the option ROM images for the two virtual network interfaces emulated in LynxSecure: Intel Corporation 82540EM Gigabit Ethernet Controller (PCI vendor/device ID 8086:100E) and Realtek Semiconductor Co., Ltd. RTL-8029(AS) (PCI vendor/device ID 10EC:8029).

If other option ROM images are required, they can be built by supplying the `IPXE_ROMS` environment variable with the space-separated list of the vendor/device IDs to build. For example, to build iPXE images for devices 10B7:9800 and 8086:100C:

```
$ make -C $ENV_PREFIX/subjects ipxe IPXE_ROMS='10b79800 8086100c'
```

Refer to section “Building an Open Source Component” (page 11) for the common make targets.

SeaBIOS

It is possible to change the configuration options in SeaBIOS before rebuilding it. To change the configuration, run the following command:

```
$ make -C $ENV_PREFIX/subjects seabios-menuconfig
```

The configuration is created in the temporary build tree, and will get removed the next time `make clean` or `make seabios-dirclean` is run. To store the new configuration permanently, run:

```
$ make -C $ENV_PREFIX/subjects seabios-update-config
```

To rebuild the SeaBIOS use the following command:

```
$ make -C $ENV_PREFIX/subjects seabios
```

Refer to section “Building an Open Source Component” (page 11) for the common make targets.

U-Boot (NXP S32V234 MPSoC)

Two configurations for U-Boot are provided, for different versions of the NXP S32V234 MPSoC board (revisions 28899 and 29288). It is possible to change the configuration options before rebuilding the bootloader. To change the configuration, run the following command (for the 28899 revision; replace 28899 with 29288 to change the configuration for the 29288 revision):

```
$ make -C $ENV_PREFIX/bootloader uboot-s32v234-evb28899-menuconfig
```

The configuration is created in the temporary build tree, and will get removed the next time `make clean` or `make uboot-s32v234-dirclean` is run. To store the new configuration permanently, run:

```
$ make -C $ENV_PREFIX/bootloader uboot-s32v234-evb28899-update-config
```

To rebuild the U-Boot image, use the following command:

```
$ make -C $ENV_PREFIX/bootloader uboot-s32v234
```

Refer to section “Building an Open Source Component” (page 11) for the common make targets.

LynxSecure® uses Buildroot [<http://buildroot.uclibc.org/>] to create the kernel and ramdisk for the Virtual Device Server and the Hardware Discovery Linux®.

Buildroot is a simple, efficient and easy-to-use tool to generate embedded Linux images through cross-compilation. It is implemented as a set of makefiles, patches and a Kconfig-based configuration framework. Buildroot allows one to extend it with additional packages, board-specific add-ons, patches, etc. Please refer to the Buildroot manual [<https://buildroot.org/downloads/manual/manual.html>] for more detailed description.

All buildroot-based projects inherit the buildroot license. The source code used can be obtained by contacting Lynx Software Technologies, Inc. Technical Support.

Projects

LynxSecure embeds two buildroot projects:

- *Hardware Discovery Linux* uses an unmodified Linux kernel and includes a set of utilities to collect hardware information from the target.
- *Virtual Device Server* uses a paravirtualized (PV) kernel to run as a LynxSecure subject (guest).



NOTE: As of current 6.3.0-rev16326 release, Hardware Discovery Linux and Virtual Device Server are supported for x86_64 architecture only.

LynxSecure uses the same Hardware Discovery Linux and Virtual Device Server images across all x86_64 targets.



NOTE: If a custom PV Linux configuration is needed, Virtual Device Server configuration can be copied and used as a starting point. Alternatively, Virtual Device Server images (kernel and ramdisk) may be used as PV Linux guests.

Table 6-1: Supported Boards

<i>ARCH</i>	<i>BOARD</i>	Description
x86_64	generic	Generic x86_64 board.

Table 6-2: Hardware Discovery Linux and Virtual Device Server buildroot project locations in the source tree.

Buildroot Project Name	<i>BUILD_NAME</i>	<i>BUILD_PATH</i>
Hardware Discovery Linux	autoconfig	<code>\$ENV_PREFIX/autoconfig/ARCH/BOARD</code>
Virtual Device Server	vds	<code>\$ENV_PREFIX/subjects/vds/ARCH/BOARD</code>

Embedded buildroot projects use the following build artifacts directories:

- `$ENV_PREFIX/build/BUILD_NAME`

Buildroot output directory.

Please refer to Buildroot output directory layout [https://buildroot.org/downloads/manual/manual.html#_buildroot_quick_start] for more details on the contents of the output directory.

- `$ENV_PREFIX/downloads`

Buildroot download directory.

- `$ENV_PREFIX/ARCH/libexec`

Buildroot image directory. Generated images:

- `$ENV_PREFIX/ARCH/libexec/BUILD_NAME-kernel-BOARD`
- `$ENV_PREFIX/ARCH/libexec/BUILD_NAME-ramdisk-BOARD.img`

Configure and Build

Buildroot project build process is integrated into the LynxSecure build framework. The following command will execute the the make target for buildroot project:

```
make -C BUILD_PATH MAKE_TARGET
```

Table 6-3: Make Targets

<i>MAKE_TARGET</i>	Description
all	Build Buildroot project.
clean	Remove all Buildroot's project build artifacts.
source	Download the Buildroot's project dependent packages from the Internet.
menuconfig	Invoke ncurses-based Buildroot project configurator.
savedefconfig	Save Buildroot project configuration file.
linux-menuconfig	Invoke ncurses-based Linux kernel configurator.
linux-update-config	Save Linux kernel configuration file.
busybox-menuconfig	Invoke ncurses-based Busybox configurator.
busybox-update-config	Save Busybox configuration file.
legal-info	Obtain the list of the applicable licenses.

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```
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Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see <http://www.cwi.nl>) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <http://www.cnri.reston.va.us>) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations (now Zope Corporation, see <http://www.zope.com>). In 2001, the Python Software Foundation (PSF, see <http://www.python.org/psf/>) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation is a sponsoring member of the PSF.

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1.3 thru 1.5.2	1.2	1995-1999	CNRI	yes
1.6	1.5.2	2000	CNRI	no
2.0	1.6	2000	BeOpen.com	no
1.6.1	1.6	2001	CNRI	yes (2)
2.1	2.0+1.6.1	2001	PSF	no
2.0.1	2.0+1.6.1	2001	PSF	yes
2.1.1	2.1+2.0.1	2001	PSF	yes
2.2	2.1.1	2001	PSF	yes
2.1.2	2.1.1	2002	PSF	yes
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2.2.1	2.2	2002	PSF	yes
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2.3.4	2.3.3	2004	PSF	yes
2.3.5	2.3.4	2005	PSF	yes
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A. HISTORY OF THE SOFTWARE

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Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see <http://www.cwi.nl>) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <http://www.cnri.reston.va.us>) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations (now Zope Corporation, see <http://www.zope.com>). In 2001, the Python Software Foundation (PSF, see <http://www.python.org/psf/>) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation is a sponsoring member of the PSF.

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Release	Derived from	Year	Owner	GPL-compatible? (1)
0.9.0 thru 1.2		1991-1995	CWI	yes
1.3 thru 1.5.2	1.2	1995-1999	CNRI	yes
1.6	1.5.2	2000	CNRI	no
2.0	1.6	2000	BeOpen.com	no
1.6.1	1.6	2001	CNRI	yes (2)
2.1	2.0+1.6.1	2001	PSF	no
2.0.1	2.0+1.6.1	2001	PSF	yes
2.1.1	2.1+2.0.1	2001	PSF	yes
2.1.2	2.1.1	2002	PSF	yes
2.1.3	2.1.2	2002	PSF	yes
2.2 and above	2.1.1	2001-now	PSF	yes

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