Deep Dive into the AOSP

Android Open Source Project

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Understand AOSP

Requirement

Initializing a Build Environment

Download Source Tree

Download Device Drivers

Build AOSP

Install AOSP

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Android open source project

- Android is an open-source software stack for a wide range of mobile devices and a corresponding open-source project led by Google

- It's commonly referred as AOSP

- AOSP has 450+ projects

- www.source.android.com

- www.b.android.com

- https://android-review.googlesource.com/

Welcome to the Android Open Source Project!

Android is an open-source software stack for a wide range of mobile devices and a corresponding open-source project led by Google. Here you can find the information and source code you need to learn more about the Android platform. From there you can create custom variants of the Android software stack, port devices and accessories to the Android platform, and ensure your devices are compatible with the Android compatibility definition.

WHAT'S NEW

New CTS media files available for download

Find **CTS media files version 1.1** for Android 5.0 media stress tests on **Compatibility Downloads**.

Android Partner Marketing offers brand guidance

The Android Partner Marketing team now offers an easy-to-use **Partner Brand Inquiry Form** for answers to branding questions and review of marketing materials.

Audio gains attributes, USB, latency, and headset documentation

The **Audio section** now describes **Attributes**, **USB digital audio** support, and **latency tools**, while a **Wired audio headset specification** can now be found in the **Accessories section**.

Encryption and SELinux revised

Encryption and **Security-Enhanced Linux** have been updated to describe the latest features of Android 5.0, such as default encryption and full enforcement of SELinux.

GETTING STARTED

Explore the Source

Get the complete Android platform and modify and build it to suit your needs. You can also **contribute to** the **Android Open Source Project repository** to make your changes available to everyone else in the Android ecosystem.

Port Android to Devices

Port the latest Android platform and create compelling devices that your customers want.

Build Accessories

Sometimes, a device can't do it all. Tap into Android's open accessory standard and build accessories to complement the wide variety of Android-powered devices.

Get Compatible

Being Android-compatible lets you offer custom features but still give users and developers a consistent and standard experience across all Android-powered devices. Android provides guidance and a test suite to verify your Android compatibility.

android

Android Open Source Project - Issue Tracker

1 - 100 of 15872 Next ›   List | Grid

ID ▼	Type ▼	Status ▼	Owner ▼	Summary + Labels ▼	Stars ▼	...
81988	Defect	New	----	Nexus 4 - Android 5.0 Lollipop - Bluetooth random disconnect in Car	1	
81987	Defect	New	----	Toolbar.isTitleTruncated() always returns false	1	
81986	----	New	to...@android.com	Unable to debug	1	
81985	Defect	New	----	WiFi not working in Nexus 4	1	
81984	Defect	New	----	ImageReader gives blank Cb and Cr planes.	1	
81983	Defect	New	----	Bug in Android Talkback	1	
81982	----	New	to...@android.com	Emulator, Nexus 6 (or 5) - API 21, Lollipop	1	
81981	Defect	New	sm...@android.com	https://developer.android.com/training/wearables/data-layer/events.html	1	
81980	Defect	New	----	com.google.android.googlequicksearchbox	1	
81979	----	New	to...@android.com	can't select Google APIs	1	
81976	Defect	New	----	can not place bluetooth call if phone is locked	1	
81975	Defect	New	jr...@android.com	Android 5.0 Lollipop: GIFs lose transparency	8	

status:open   Search   Sign In

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Search for status:open

Subject	Status	Owner	Project	Branch	Updated	Size	CR	V
▶ Add LOCAL_EXPORT_C_INCLUDE_DIRS to libunwind and libunwind-ptrace targets		Trevor Drake	platform/external/libunwind	master	10:14 AM			✓
Clatd performance tuning.		Lorenzo Colitti	platform/external/android-clat	master	9:48 AM			
Add a microbenchmark for tun write performance.		Lorenzo Colitti	platform/external/android-clat	master	9:48 AM			
Move send_tun into tun.c as well.		Lorenzo Colitti	platform/external/android-clat	master	9:48 AM			
Switch x86 and x86_64 to 4.9		Andrew Hsieh	platform/build	master	8:23 AM			✓
MtpService: start MtpServer if it's teminated		Bo Huang	platform/packages/providers/MediaProvider	master	7:00 AM			✓
Bluetooth-OPP: Fix OPP Transfer Declining		Yong Yao	platform/packages/apps/Bluetooth	master	6:30 AM			
Fixed missed write access lock when setting JDK.		Alex Ruiz	platform/tools/adt/idea	studio-1.0-dev	Dec 7		+1	✓
Now we correctly find and update Android Gradle plugin versions.		Alex Ruiz	platform/tools/adt/idea	studio-1.1-dev	Dec 7		+1	✓
Fixed missing write access lock when setting up sdks in modules.		Alex Ruiz	platform/tools/adt/idea	studio-1.0-dev	Dec 7		+1	✓
Fix missing enter key		Bo Hu	platform/external/qemu	studio-1.0-dev	Dec 7			✓
Fix missing enter key		Bo Hu	platform/external/qemu	studio-1.0-release	Dec 7			✓
Clean up adb/Android.mk		Trevor Drake	platform/system/core	master	Dec 7			
Use libz instead of libunz		Trevor Drake	platform/external/srec	master	Dec 7			
Add exception for /dev/jpu in FileSystemPermissionTest		Yu Ming Chen	platform/cts	master	Dec 7			
MPEG4Writer: fix mMoovBoxBuffer memory leak		Hidenari Koshimae	platform/frameworks/av	master	Dec 7			
bootchart: fix bootchart can not be triggered problem		YongQin Liu	platform/system/core	master	Dec 7		+1	
Fix signal mask save/restore for arm64.		Elliott Hughes	platform/bionic	master	Dec 7			✓
Fix signal mask save/restore for x86-64.		Elliott Hughes	platform/bionic	master	Dec 7			✓
Track date format changes for es_ES and es_US.		Narayan Kamath	platform/libcore	master	Dec 6			✓
bootchart: add policy rules for bootchart		YongQin Liu	platform/external/sepolicy	master	Dec 6			
screenrecord: do not exit when use pipe streaming		Young-Ho Cha	platform/frameworks/av	master	Dec 6			
Disable ASAN for rsg-generator.		Dan Albert	platform/frameworks/support	master	Dec 6			✓
Disable ASAN for rsg-generator.		Dan Albert	platform/frameworks/rs	master	Dec 6			✓
Libui: Remove unused variables		Andreas Gampe	platform/frameworks/native	master	Dec 6		✓	✓

Next⇒

Understand AOSP

Requirement

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Build AOSP

Install AOSP

Requirement

- Operating System: Linux (Ubuntu) or Mac

- Environment : 64 bit

- Disk Space for Source : 40 GB

- Disk Space for Build : 100 GB

- Software Requirements :
  - Python 2.6 -- 2.7
  - GNU Make 3.81 -- 3.82
  - JDK 7
  - Git 1.7 or newer

Repo, Gerrit, Manifest

- **Repo** is a repository management tool that google has built on top of Git. Repo unifies the many Git repositories when necessary, does the uploads to our revision control system.

- **Gerrit** is a web-based code review system for projects that use git. Gerrit encourages more centralized use of Git by allowing all authorized users to submit changes, which are automatically merged if they pass code review

- **Manifest** – A manifest file is an XML file, describing a list of repositories to sync our working directory with.

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Initializing a Build Environment

- Install JDK-7

```
$ sudo apt-get update
$ sudo apt-get install openjdk-7-jdk
```

- Required package for Ubuntu 14.x

```
$ sudo apt-get install bison g++-multilib git
gperf libxml2-utils
```

Install Repo

- Make sure you have a bin/ directory in your home directory and that it is included in your path:

```
$ mkdir ~/bin
$ PATH=~/bin:$PATH
```

- Download the Repo tool and ensure that it is executable:

```
$ curl https://storage.googleapis.com/git-repo-downloads/repo > ~/bin/repo
$ chmod a+x ~/bin/repo
```

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Initialization Repo Client

- Create an empty directory to hold your working files. If you're using MacOS, this has to be on a case-sensitive filesystem. Give it any name you like:

```
$ mkdir AOSP
$ cd AOSP
```

- Run repo "init" to bring down the latest version of Repo with all its most recent bug fixes.

```
$ repo init -u
https://android.googlesource.com/platform/manife
st
```

Download Source Tree

- Download Source Tree

    ```
    $ repo sync -j(--jobs)
    ```

- It will download almost 40 GB.
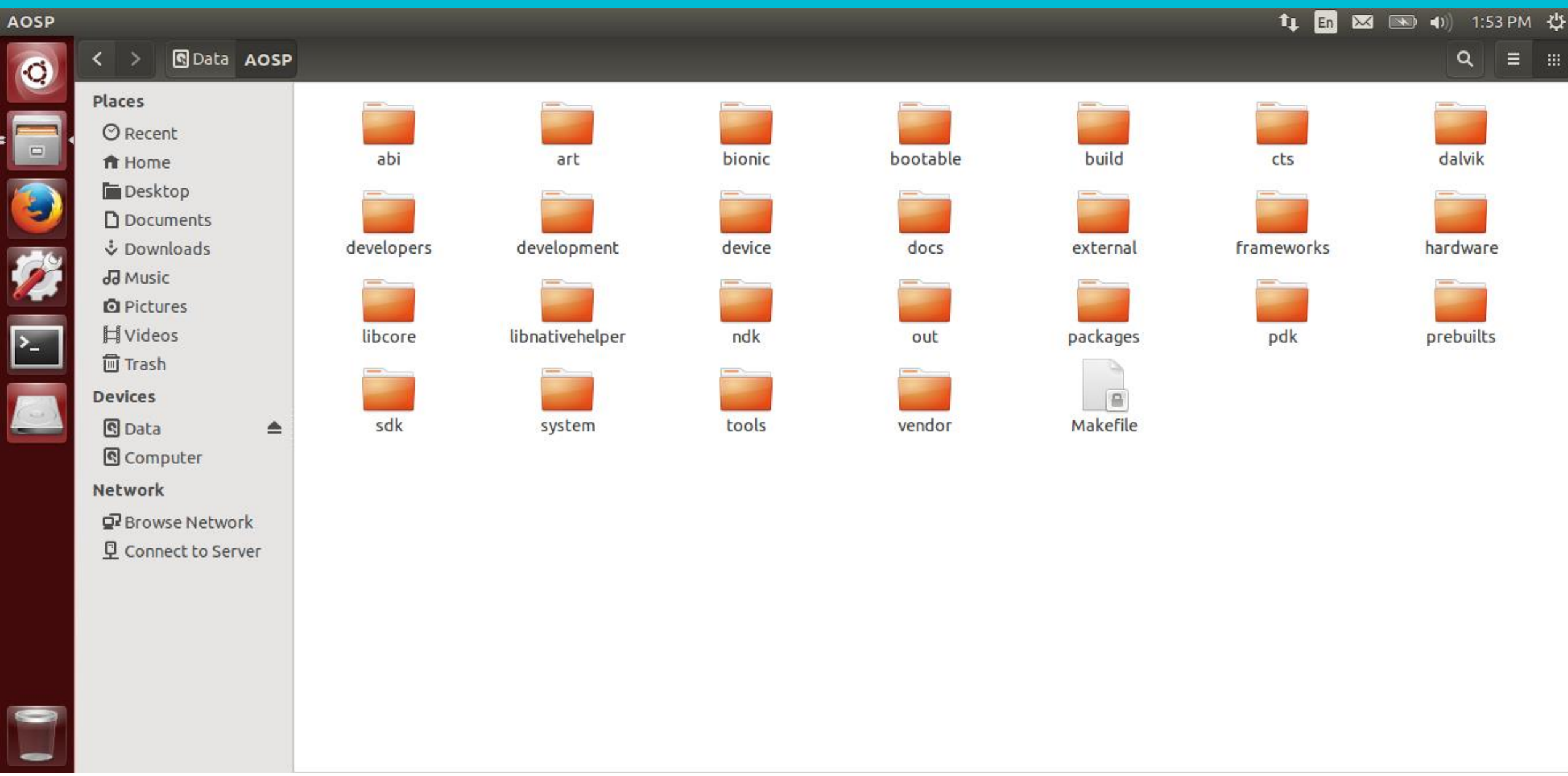
Deep Dive into the Source Tree

- **Bionic** - the C-runtime for Android. Note that Android is not using glibc like most Linux distributions.

- **Bootable** - boot and startup related code.

- **Build** - the build system implementation including all the core make file templates.

- **Cts** - the compatability tests. The test suite to ensure that a build complies with the Android specification.

- **Dalvik** - the source code for the implementation of the Dalvik Virtual Machine

Deep Dive into the Source Tree

- **Development** - projects related to development such as the source code for the sdk and ndk tools

- **Device** - product specific code for different devices.

- **External** - contains source code for all external open source projects such as SQLite, Freetype and webkit.

- **Frameworks** - this folder is essential to Android since it contains the sources for the framework. Here you will find the implementation of key services such as the System Server with the Package- and Activity managers.

Deep Dive into the Source Tree

- **Hardware** - hardware related source code such as the Android hardware abstraction layer specification and implementation.

- **Out** - the build output will be placed here after you run make.

- **Packages** - contains the source code for the default applications such as contacts, calendar, browser.

- **Prebuilt** - contains files that are distributed in binary form for convenience.

- **System** - source code files for the core Android system. That is the minimal Linux system that is started before the Dalvik VM and any java based services are enabled.

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Build for Device

| Device	Code name	Build configuration
Nexus 6	shamu	aosp_shamu-userdebug
Nexus Player	fugu	aosp_fugu-userdebug
Nexus 9	volantis (flounder)	aosp_flounder-userdebug
Nexus 5 (GSM/LTE)	hammerhead	aosp_hammerhead-userdebug
Nexus 7 (Wi-Fi)	razor (flo)	aosp_flo-userdebug
Nexus 7 (Mobile)	razorg (deb)	aosp_deb-userdebug
Nexus 10	mantaray (manta)	full_manta-userdebug
Nexus 4	occam (mako)	full_mako-userdebug
Nexus 7 (Wi-Fi)	nakasi (grouper)	full_grouper-userdebug
Nexus 7 (Mobile)	nakasig (tilapia)	full_tilapia-userdebug
Galaxy Nexus (GSM/HSPA+)	yakju (maguro)	full_maguro-userdebug
Galaxy Nexus (Verizon)	mysid (toro)	aosp_toro-userdebug
Galaxy Nexus (Experimental)	mysidspr (toroplus)	aosp_toroplus-userdebug
PandaBoard (Archived)	panda	aosp_panda-userdebug
Motorola Xoom (U.S. Wi-Fi)	wingray	full_wingray-userdebug
Nexus S	soju (crespo)	full_crespo-userdebug
Nexus S 4G	sojus (crespo4g)	full_crespo4g-userdebug

Download Drivers for the Device

https://developers.google.com/android/nexus/drivers

Hardware Component	Company	Download	MD5 Checksum	SHA-1 Checksum
NFC, Bluetooth, Wi-Fi	Broadcom	Link	7e17f21d52c0073d97214b30b90e9b27	c0a889d3a97f4ae7514fe129084f32e5e562986d
Camera, Sensors, Audio	LG	Link	91fdeb528cb53ffbd159c6dd0e630b46	acd98e07490493d47c82dff49fa89d85b0e61663
Graphics, GSM, Camera, GPS, Sensors, Media, DSP, USB	Qualcomm	Link	605fa30073fc1d390e43b8d839d6bda7	218da32596d3b2183c7bf11f9bbd29e5adcb52c7

Extract Drivers for the Device
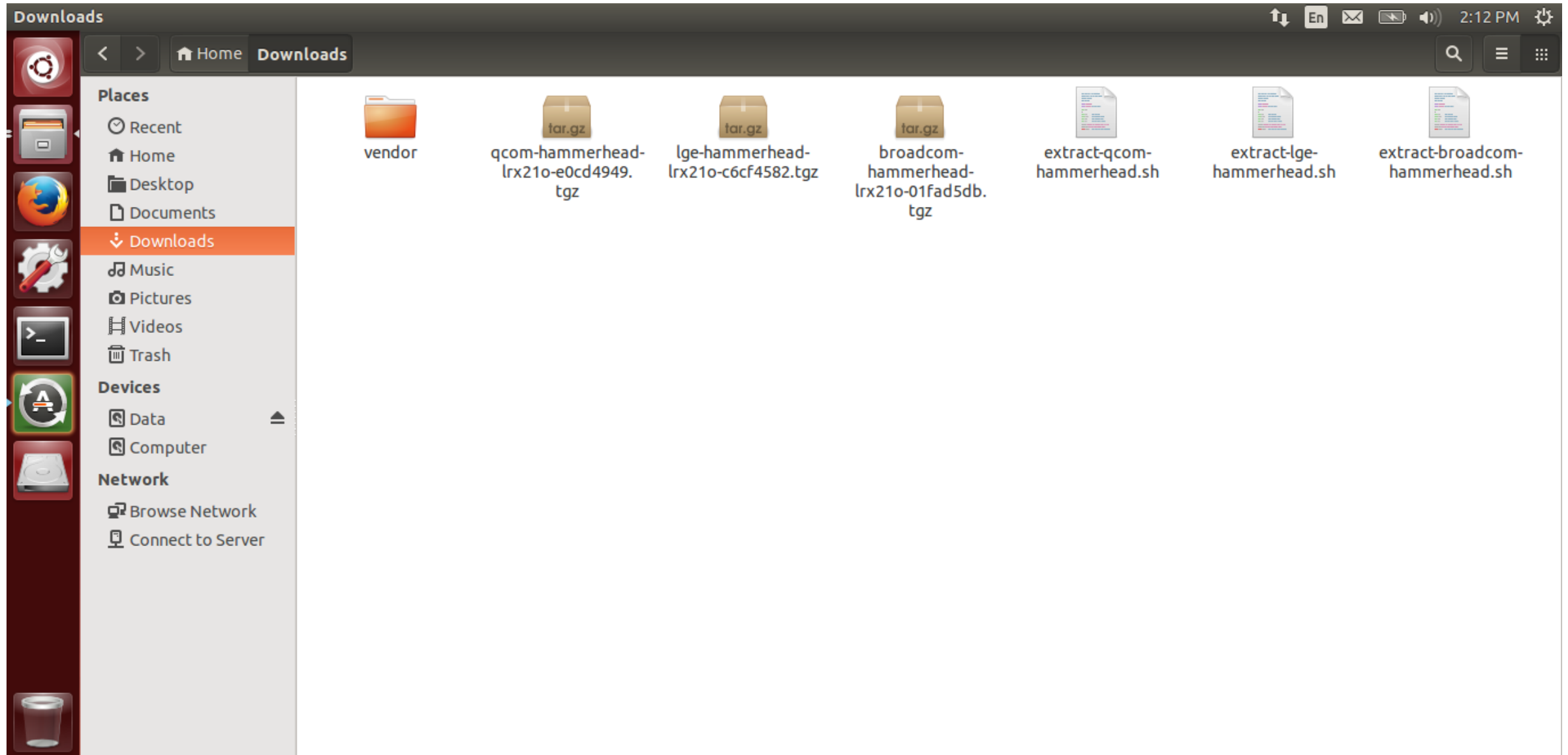
Extract Drivers for the Device
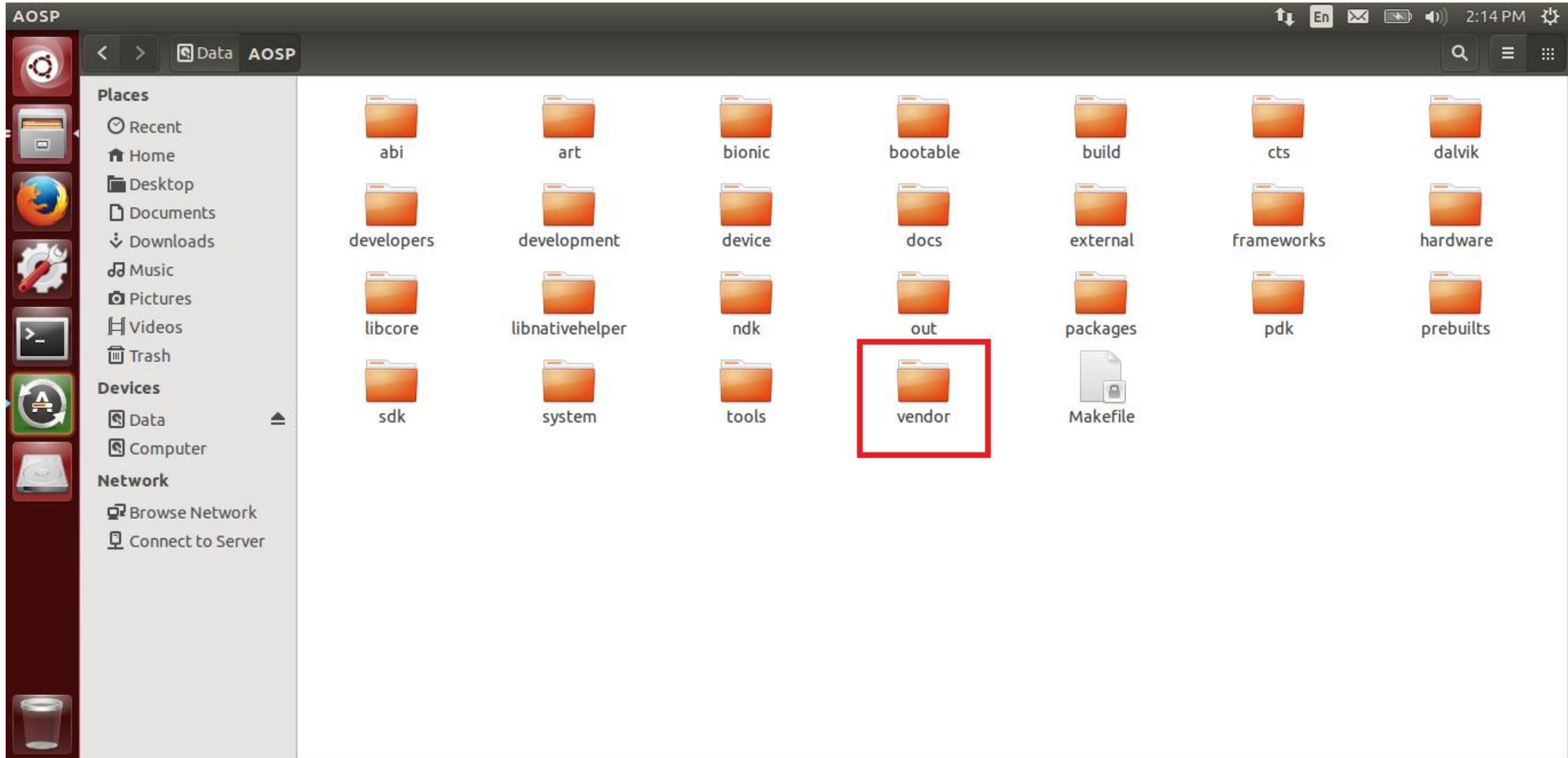
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Build AOSP

- Initialize Build Environment

```
$ source build/envsetup.sh
            or
$ . build/envsetup.sh
```

- Choose Target

```
$ lunch
```

Build AOSP

Build AOSP

- Choose Target

    `$ lunch`

- Press 8 and enter
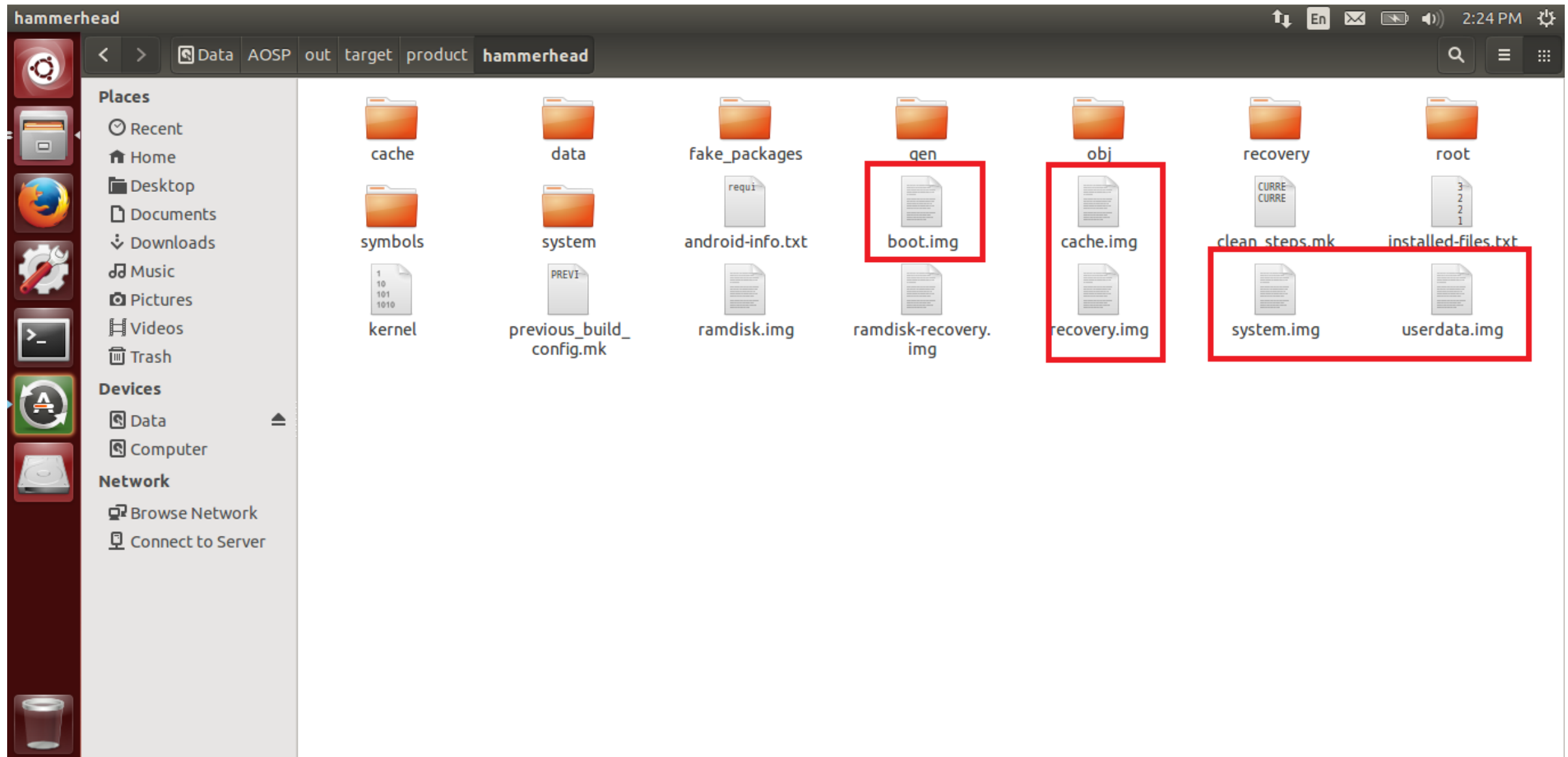

- Start build with make command

    `$ make -j4`

Wait…….

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Install AOSP

Install AOSP Build in Nexus 5

```
fastboot oem unlock
fastboot flash recovery recovery.img
fastboot flash boot boot.img
fastboot flash cache cache.img
fastboot flash userdata userdata.img
fastboot flash system system.img
fastboot reboot
```

Enjoy... You own build...

Repo Commands

sync

init

upload

diff

download

start

status

$repo help COMMAND

Helper functions

- **croot:** change directory to the top of the tree

- **m**: execute 'make' from the top of the tree

- **mm** - builds all of the modules in the current directory

- **mmm <dir1>**: build all of the modules in the supplied directories

- **cgrep <pattern>**: grep on all local C/C++ files

- **jgrep <pattern>:** grep on all local Java files

- **resgrep <pattern>:** grep on all local res/*.xml files

- **godir <filename>:** go to the directory containing a file

Thank You

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