

制作 **Loongson** 版 **Debian squeeze** 系统
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1.背景

本文档试图通过官方源码为龙芯 2F 笔记本制作 Debian squeeze 系统。

需要的设备:

龙芯母机: 一台龙芯 2F 或 3A 机器, 并有原装 Debian 系统(版本不限)

X86 母机: 如果需要交叉编译内核, 则需要一台 X86 机器, 预装 X86_64 的 Linux 系统

龙芯 2F 笔记本: 作为本文安装的目标机

2.制作 squeeze 基本系统 (在龙芯母机上运行)

2.1 下载基本系统

```
debootstrap squeeze ./chroot-squeeze http://ftp.debian.org/debian
```

2.2 设置 root 密码:

```
chroot ./chroot-squeeze;
```

```
使用 passwd 修改密码;
```

```
exit
```

3.制作内核

3.1 使用源码安装内核 (在 X86 母机上运行)

3.1.1 制作编译内核的交叉工具链

采用 gcc4.4.4+binutils-2.20.1, 请在 gnu 网站上自行下载

```
mkdir toolchain
```

```
cd toolchain
```

```
wget gcc4.4.4.tar.bz2 和 binutils-2.20.1.tar.bz2
```

编译 binutils-2.20.1, vi make-binutils.sh, 写入如下内容:

```
#!/bin/sh
```

```
cross_host="x86_64-linux-gnu"
```

```
#根据本机修改
```

```
cross_target="mips64el-linux"
```

```
dell_install_path="/Your-Install-Path/install"
```

```
binutils_version="binutils-2.20.1"
```

```
binutils_suffix=".tar.bz2"
```

```
#mkdir -pv ./install
```

```
# build binutils-2.20
```

```
if [ ! -e ./binutils_version ]; then
```

```
    echo "tar xf " $binutils_version$binutils_suffix", please waiting..."
```

```
    echo
```

```
    tar xf $binutils_version$binutils_suffix
```

```
fi
```

```

if [ -e ./build-binutils ]; then
    rm -rf ./build-binutils
fi

mkdir -pv ./build-binutils
cd build-binutils
../$binutils_version/configure --prefix=$dell_install_path \
--build=$cross_host --host=$cross_host --target=$cross_target \
--enable-shared --disable-werror -v \
&& make \
&& make install
cd ../

echo "End of building binutils toolchain"

```

运行. ./make-binutils.sh, 如果在 configure 过程中停掉, 请安装相应包, 并重新执行 . ./make-binutils.sh

编译 gcc-4.4.4, vi make-gcc.sh, 写入以下内容:

```
#!/bin/sh
```

```

cross_host="x86_64-linux-gnu"
#根据本机修改
cross_target="mips64el-linux"

dell_install_path="/Your-Install-Path/install"

gcc_version="gcc-4.4.4"
gcc_suffix=".tar.bz2"

sudo apt-get install libgmp-dev libmpfr-dev libmpc-dev

if [ ! -e ./$gcc_version ]; then
    echo "tar xf " $gcc_version$gcc_suffix ", please waiting..."
    echo
    tar xf $gcc_version$gcc_suffix
fi

```

```

if [ -e ./build-gcc ]; then
    rm -rf ./build-gcc
fi

mkdir -pv ./build-gcc
cd ./build-gcc
env \
    ../$gcc_version/configure --prefix=$dell_install_path \
    --build=$cross_host --host=$cross_host --target=$cross_target \
    --disable-shared --enable-languages=c --disable-threads --disable-werror \
    -v \
    && make all-gcc -j4\
    && make install-gcc
cd ../

```

运行 `./make-gcc.sh`，如果在 configure 过程中停掉，请安装相应包，并重新执行 `./make-gcc.sh`

3.1.2 编译龙芯 2F 笔记本的内核

从官方下载最新内核源码，例如 `linux-3.5.1.tar.bz2`

```
tar xf linux-3.5.1.tar.bz2
```

```
cd linux-3.5.1
```

```
cp arch/mips/configs/lemote2f_defconfig ./config
```

```
make ARCH=mips menuconfig，检查一下并退出
```

```
make ARCH=mips CROSS_COMPILE=/Your-Install-Path/install/bin/mips64el-linux-
```

3.2 使用 apt 安装内核（在龙芯母机上运行，未测试）

```
chroot ./chroot-squeeze
```

```
vi /etc/apt/sources.list，写入以下内容：
```

```
deb http://linux-libre.fsfla.org/pub/linux-libre/lemote/gnewsense metad main
```

```
保存退出
```

```
wget http://www.fsfla.org/svnwiki/selibre/linux-libre/download/SIGNING-KEY
```

```
apt-key add SIGNING-KEY
```

```
apt-get update
```

```
apt-cache search linux-image loongson
```

```
最后用 apt-get install 安装有 loongson 2f 字样的内核包
```

4. 制作系统硬盘（需要将龙芯 2F 笔记本的硬盘接入 X86 母机或者龙芯母机，然后在母机上操作）

假设龙芯 2F 笔记本的硬盘（以 sata 硬盘为例）分区 `sdb1`（`sda` 为已有硬盘）为系统安装分区，大小至少需要 5G

```
mkfs.ext3 /dev/sdb1
```

```
mount /dev/sdb1 /mnt
```

```
cp -af ./chroot-squeeze/* /mnt/
```

如果采用自己编译的内核，则做如下操作：

```
cp 编译好的 vmlinux.32 /mnt/boot/vmlinux
cp 编译好的 modules /mnt/lib/modules/
```

5.启动新系统（在龙芯 2F 笔记本上操作）

将制作好的 sata 硬盘介入 2F 笔记本，此时该 sata 硬盘被识别为 hda1

启动 2F 笔记本电源

点击 Del 进入 Pmon 设置

在 Pmon 中执行：

```
set al "load /dev/fs/ext2@wd0/boot/vmlinux"
set karg "console=tty root=/dev/sda1"
reboot
```

成功进入系统

6.编译制作 Xorg（在龙芯 2F 笔记本上操作）

由于 Debian Squeeze 官方的 Xorg 无法在 2F 笔记本上正常运行，因此需要加补丁重新编译

6.1 配置系统

通过 root 用户进入系统，密码为 3.2 中设置的密码

配置 IP，网关和 DNS 服务器

vi /etc/apt/sources.list，写入两行：

```
deb http://ftp.debian.org/debian main non-free contrib
deb-src http://ftp.debian.org/debian main non-free contrib
```

apt-get update

6.2 安装必要包

```
apt-get build-dep xorg-server
```

6.3 编译 Xorg 代码

```
mkdir xorg-server
cd xorg-server
apt-get source xorg-server
# Unpacking should happen automatically # dpkg-source -x xorg-server*.dsc
cd xorg-server*/debian/patches/
wget http://jasonwoof.com/downloads/01_mips-sarea.diff
echo "01_mips-sarea.diff" >> series
cd ../..
dpkg-buildpackage -b -uc
cd ..
dpkg -i xserver-{common,xephyr,xorg-{core,dev}}_*.deb
```

其中 01_mips-sarea.diff 的内容如下：

```
diff -urN xorg-server-1.3.0.orig/hw/xfree86/dri/sarea.h xorg-server-
1.1.1/hw/xfree86/dri/sarea.h

--- xorg-server-1.3.0.orig/hw/xfree86/dri/sarea.h      2006-07-06
02:31:40.000000000 +0800

+++ xorg-server-1.3.0/hw/xfree86/dri/sarea.h      2007-10-30 14:23:47.000000000
+0800

@@ -44,6 +44,8 @@

/* SAREA area needs to be at least a page */

#ifdef(__alpha__)

#define SAREA_MAX                0x2000

+#elif defined(__mips__)

+#define SAREA_MAX                0x4000

+#elif defined(__ia64__)
```

```

#define SAREA_MAX                                0x10000          /* 64kB */

#else

diff --git a/hw/xfree86/os-support/linux/lxx_video.c b/hw/xfree86/os-
support/linux/lxx_video.c
index 688106a..1552860 100644
--- a/hw/xfree86/os-support/linux/lxx_video.c
+++ b/hw/xfree86/os-support/linux/lxx_video.c
@@ -505,9 +505,10 @@ _X_EXPORT volatile unsigned char *ioBase = NULL;

_X_EXPORT Bool
xf86EnableIO(void)
{
-#if defined(__powerpc__)
+#if defined(__powerpc__) || defined(__mips__)
    int fd;

    unsigned int ioBase_phys;
+    extern unsigned int IOPortBase;

    #endif

    if (ExtendedEnabled)
@@ -532,7 +533,22 @@ xf86EnableIO(void)
    #endif

    }

    close(fd);

-#elif !defined(__mc68000__) && !defined(__sparc__) && !defined(__mips__) && !
defined(__sh__) && !defined(__hppa__) && !defined(__s390__) && !defined(__arm__)
&& !defined(__m32r__)
+#elif defined(__mips__)

+    fd = open("/dev/mem", O_RDWR);

+    IOPortBase = (volatile unsigned char *)mmap(0, 0x20000,

+        PROT_READ | PROT_WRITE, MAP_SHARED, fd,

+        0x1fd00000);

+    if (IOPortBase == MAP_FAILED) {

```

```

+         xf86Msg(X_WARNING,
+
+                 "xf86EnableIOPorts: Failed to map iobase
(%s)\n",
+
+                 strerror(errno));
+
+         return FALSE;
+     }
+
+     close(fd);
+
+     xf86Msg(X_WARNING,
+
+             "xf86EnableIOPorts: map iobase (%x)\n",
+
+             IOPortBase);
+
+ #elif !defined(__mc68000__) && !defined(__sparc__) && !defined(__sh__) && !
+ defined(__hppa__) && !defined(__s390__) && !defined(__arm__) && !
+ defined(__m32r__)
+
+     if (ioperm(0, 1024, 1) || iopl(3)) {
+
+         if (errno == ENODEV)
+
+             ErrorF("xf86EnableIOPorts: no I/O ports found\n");

```

6.4 配置 xorg.conf

vi /etc/X11/xorg.conf, 写入以下内容:

```

# xorg.conf (X.Org X Window System server configuration file)
#
# This file was generated by dexconf, the Debian X Configuration tool, using
# values from the debconf database.
#
# Edit this file with caution, and see the xorg.conf manual page.
# (Type "man xorg.conf" at the shell prompt.)
#
# This file is automatically updated on xserver-xorg package upgrades *only*
# if it has not been modified since the last upgrade of the xserver-xorg
# package.
#
# If you have edited this file but would like it to be automatically updated
# again, run the following command:
#   sudo dpkg-reconfigure -phigh xserver-xorg

Section "Device"
    Identifier      "Card0"
    Driver          "siliconmotion"
    Option          "pci_burst" "true"
    Option          "HWCursor" "true"
    Option          "VideoKey" "45000"
    Option          "UseBIOS" "false"
    Option          "PanelSize" "1024x600"
    Option          "CSCVideo" "false"
EndSection

Section "Screen"
    Identifier      "Screen0"
    Device          "Card0"

```

```
        Monitor      "Monitor0"
        DefaultDepth  16
EndSection
```

7.安装 **gnome** (在龙芯 2F 笔记本上操作)

```
apt-get install gdm3
adduser username
restart
同过 username 登陆 gnome 即可
```

8.解决一些问题

8.1 **gnome** 系统没有预装 **gnome-terminal**

解决方法:

```
使用 root 用户从字符界面登陆, 并 apt-get install gnome-terminal
```

8.2 登陆 **gnome** 后键盘映射出错

解决方法:

```
同时按 Fn+F7(NmLk) 可以切换键盘映射
```

结束!

参考文献:

<http://wiki.debian.org/DebianYeeloong/HowTo/Install>