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 */

 #if defined(__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/lnx_video.c b/hw/xfree86/os-
support/linux/lnx_video.c

index 688106a..1552860 100644

--- a/hw/xfree86/os-support/linux/lnx_video.c

+++ b/hw/xfree86/os-support/linux/lnx_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 usrname
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