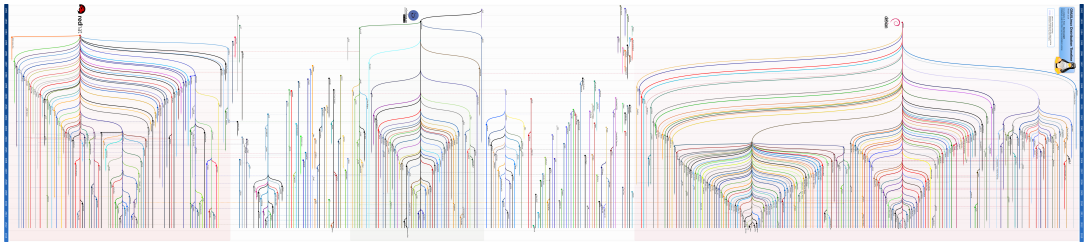
客製化、個性化 Linux

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- 參考資料
    1. kickstart
    2. SquashFS
    3. RedHat Customer Protal

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Part I

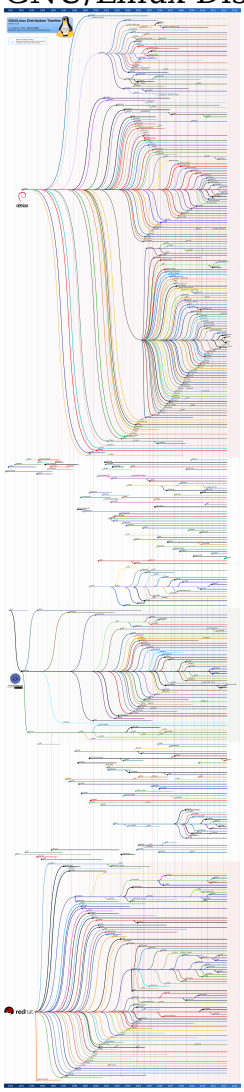
安装

Chapter 1

下載與安裝

1.1 Linux 演進

GNU/Linux Distribution Timeline



1.2 iso 下載

1. DYW LINUX
2. 義守大學 ftp 站
3. Goolge "linux distribution iso download", ex. "scientific iso download"
4. scientific linux
5. 將下載的 iso 檔燒成 dvd 或 cd，特別注意：必須燒成映像檔，才能開機安裝。

```
## Linux 下燒錄指令
## for cd
cdrecord -scanbus
3,0,0 300) 'ATAPI ' 'DVD A DH16AAS ' 'JA21' Removable CD-ROM
cdrecord -v -dao dev=3,0,0 crt20120919.iso
## cdrecord /dev/sr1 -data /crt/crt.iso
## for dvd
dvdrecord -scanbus
scsibus2:
    2,0,0   200) 'hp      ' 'DVD A  DH16ABLH ' '3HD9' Removable CD-ROM
    2,1,0   201) *
    2,2,0   202) *
    2,3,0   203) *
    2,4,0   204) *
    2,5,0   205) *
    2,6,0   206) *
    2,7,0   207) *
dvdrecord -dao -dev=2,0,0 /crt/crt.iso
```

1.3 安裝

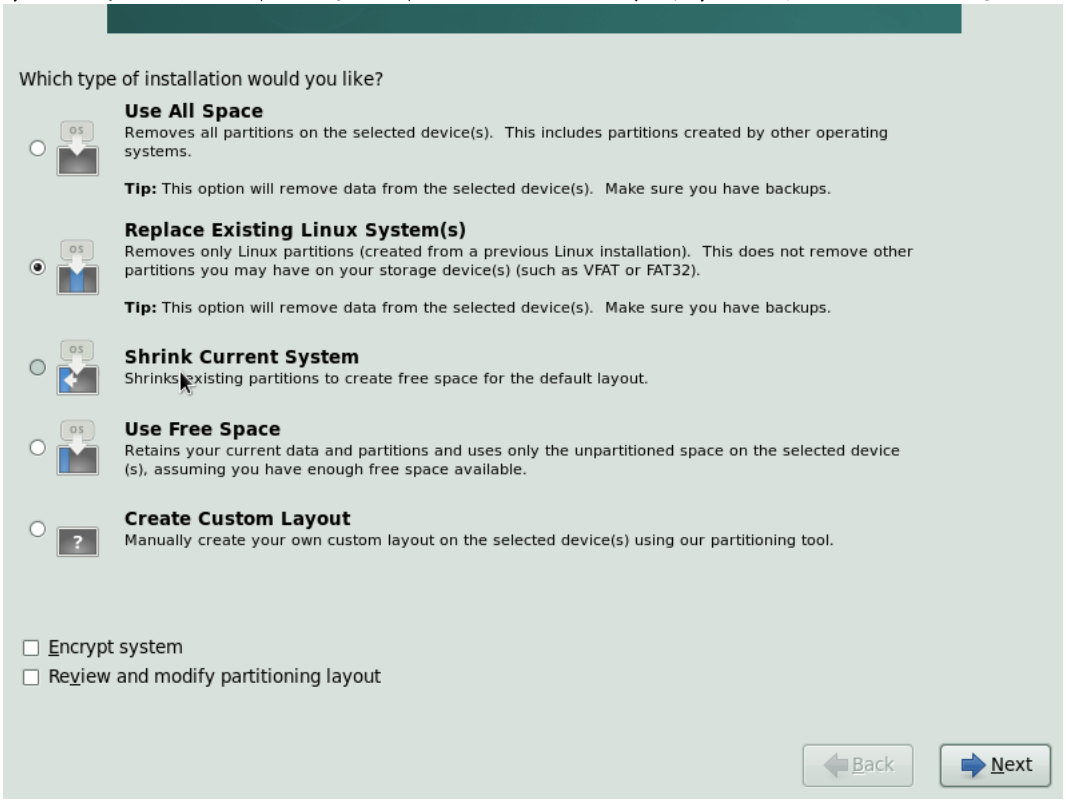
1. 將燒好的安裝光碟，放入要安裝的電腦光碟機中，選擇光碟開機，就會進入開機流程畫面。
2. 一般 Linux 安裝不像 Windows 全自動，原因是 Linux 非常有彈性，可以依照使用的設定進行安裝。例如：若硬碟中已存在其他作業系統，如 Winodws，Linux 安裝會詢問使用者是否保留原作業系統，或做什麼樣的處理？
3. 因 Linux 的安裝太彈性，造成部分初學者的恐懼與困擾，但也正是 Linux 迷人的地方。Linux 可以依照自己的喜好安裝，可以與其他系統共存，不像 Windows 安裝，內定整個電腦、整顆硬碟都是屬於"它"，不管原硬碟中是否有其他作業系統、是否要保留硬碟部分分割的資料。

4. 現今的 Linux 安裝已不像以前那麼不人性，必須自行設定各種硬體的驅動程式。大概只要設定時區、語系、網路、選擇套件、硬碟分割…等較個人化的設定。

5. 大部分安裝設定如語系，時區，即使安裝時設定不當，安裝後仍然可以重新設定。安裝套件不足可以再安裝，沒有套件可以移出，但硬碟分割方式則很難改變，而且原有作業系統若已覆蓋，也無法還原。這是造成初學者恐懼與困擾的最主要原因。

6. 如果電腦中不只一顆硬碟（含隨身碟），會出現詢問選擇安裝硬碟的畫面，必須先選擇使用那顆硬碟。務必確認選取的硬碟是您要安裝的硬碟。

7. 安裝只要照著流程設定，即使設定錯誤或不恰當也沒關係，可以於安裝完成後再重新設定。所以，以下僅對安裝硬碟的分割設定做說明：



(a) Use All Space: 使用所有硬碟空間，這個選項會移除硬碟中所有分割區，包含原有作業系統。

(b) Replace Existing Linux System(s): 取代存在的 Linux 系統，只移除原有的 Linux 分割區並安裝於這些分割區下，不會影響到其他分割區，如 VFAT 或 FAT32 等。

(c) Shrink Current System: 從現有的分割區中，擠出空間進行預設配置安裝。

(d) Use Free Space: 只使用硬碟中未分割的空間，當然未分割的空間必須夠大。

(e) Create Custom Layout: 自行設定分割方式，此爲最具彈性的分割方式，可以提供已熟悉 Linux 的使用者，分割出最符合自己需求的硬碟配置，其中甚至包含 RAID 及 LVM 的配置。

Chapter 2

iso 檔建立

2.1 安裝資料收集

1. 複製下載的 Linux iso 安裝光碟檔資料。

   (a) 自動光碟掛載：現在 Linux 系統和 Windows 一樣，當放入光碟後，系統會自動掛載。

```
1. 查看掛載
[root@dyH ~]# df | grep media
/dev/sr0              1048118   1048118         0 100% /media/
    CDROM
2. 建立工作目錄
[root@dyH ~]# mkdir /usr/isotmp
3. 複製檔案
[root@dyH ~]# cp -a /media/CDROM/* /usr/isotmp/
```

   (b) 不燒光碟，直接掛載 iso 檔。

```
[root@dyH src]# mkdir /usr/src/crtiso
[root@dyH src]# mount -o loop crt20130727.iso /usr/src/crt
crt20130727.iso  crtiso/
[root@dyH src]# mount -o loop crt20130727.iso /usr/src/crtiso
[root@dyH src]# ls /usr/src/crtiso/
add              images                    RPM-GPG-KEY-CentOS-Debug
    -6
bin              isolinux                  RPM-GPG-KEY-CentOS-
    Security-6
CentOS_BuildTag  Packages                  RPM-GPG-KEY-CentOS-
    Testing-6
EFI              RELEASE-NOTES-en-US.html  TRANS.TBL
EULA             repodata
GPL              RPM-GPG-KEY-CentOS-6
```

2. 光碟安裝主程式目錄

```
[root@dyH src]# cd /usr/src/crtiso/isolinux/
[root@dyH isolinux]# ll
total 33496
-r--r--r--. 1 root root     2048 Jul 27 19:17 boot.cat
-rw-r--r--. 1 root root       84 Aug 26  2012 boot.msg
-rw-r--r--. 1 root root      334 Aug 26  2012 grub.conf
-rw-r--r--. 1 root root 30027599 Aug 26  2012 initrd.img
-rw-r--r--. 1 root root    14336 Jul 27 19:07 isolinux.bin
-rw-r--r--. 1 root root     1037 Jul 27 19:17 isolinux.cfg
-rw-r--r--. 1 root root   160280 Aug 26  2012 memtest
-rw-r--r--. 1 root root    16794 Nov 22  2011 pxelinux.0
drwxr-xr-x. 2 root root     2048 Sep 20  2012 pxelinux.cfg
-rw-r--r--. 1 root root   130068 Aug 26  2012 splash.jpg
-r--r--r--. 1 root root     2661 Jul 27 19:17 TRANS.TBL
-rw-r--r--. 1 root root   147996 Aug 26  2012 vesamenu.c32
-rwxr-xr-x. 1 root root  3791040 Aug 26  2012 vmlinuz
```

3. 安裝設定檔

```
[root@dyH isolinux]# cat isolinux.cfg
default vesamenu.c32
prompt 0
timeout 60

display boot.msg

menu background splash.jpg
menu title Welcome to DYWANG 6.0!
menu color border 0 #ffffffff #00000000
menu color sel 7 #ffffffff #ff000000
menu color title 0 #ffffffff #00000000
menu color tabmsg 0 #ffffffff #00000000
menu color unsel 0 #ffffffff #00000000
menu color hotsel 0 #ff000000 #ffffffff
menu color hotkey 7 #ffffffff #ff000000
menu color scrollbar 0 #ffffffff #00000000

label crt
  menu label Install ^Certification system
  menu default
  kernel vmlinuz
  append load_ramdisk=1 initrd=initrd.img ks=cdrom:/add/crt-ks.cfg
label local
  menu label Boot from ^local drive
  localboot 0xffff
label memtest86
  menu label ^Memory test
  kernel memtest
  append -
```

4. 自動安裝檔 ks=cdrom:/add/crt-ks.cfg，自動安裝檔格式參考9。

5. Linux 完成安裝，在 /root 目錄下有一安裝設定檔，記錄安裝過程，內容與自動安裝檔類似。

```
[root@dyH ~]# ll anaconda-ks.cfg
-rw-------. 1 root root 1284 Feb 23 10:35 anaconda-ks.cfg
```

2.2 產生 iso 檔

1. 安裝 mkisofs 工具

```
[root@dyH ~]# yum install genisoimage
```

2. 使用 mkisofs 工具

```
[root@dyH ~]# mkisofs -o /usr/src/crt`date +%Y%m%d`.iso -b isolinux/
    isolinux.bin \
-c isolinux/boot.cat -no-emul-boot -boot-load-size 4 \
-boot-info-table -R -J -v -T /usr/src/crtiso

## 參數說明
-o : 產生的 iso 檔
-b : 開機啓動 image 檔
-v : 顯示執行過程
-c, -no-emul-boot, -boot-load-size, -R, -J, -T 等爲 El Torito bootable
    CD 規格相關的選項
```

3. 套件存放目錄預設爲 Packages，若改成其他名稱再重新產生 repodata，以 PXE 及 CD 安裝都沒問題，但使用 extlinux USB 安裝時無法掛載，訊息如下：

```
Warning: ..... doesn't have binary rpms, skipping
```

Chapter 3

kickstart 安裝

3.1 kickstart 簡介

1. Kickstart 讓使用者可以依照自己的需求，安裝 Red hat Linux 系統。
2. Kickstart 安裝方法：
   (a) 產生 kickstart file
   (b) 產生可開機系統，此系統包含 kickstart file。
   (c) 建立安裝資源，來源可以是 a local CD-ROM, a local hard drive, NFS, FTP, or HTTP
   (d) 開機系統讀取 kickstart file，並經由安裝資源安裝套件。
3. Kickstart file 格式
   (a) kickstart file 跟一般 Linux 設定檔一樣，是一個 ASCII 檔。
   (b) kickstart file 依序必須有：

```
1 Command section
%packages section
3 %pre and %post sections <--這兩個 sections 順序可變
```

   (c) 不需要的項目可以省略。例如：刪除”語系”設定的命令，安裝時在 kickstart file 中查不到”語系”設定，就會出現需要安裝者選取”語系”的畫面。
   (d) 符號 # 開頭爲註解

3.2 kickstart sections

1. Kickstart Options
2. Package Selection
3. Pre-installation Script
4. Post-installation Script

3.3 kickstart file

1. kickstart 範例

```
[root@dywH add]# cat kvm-ks.cfg

# Kickstart file automatically generated by anaconda.
#version=RHEL6
install
#cdrom
#url --url=ftp://192.168.122.1/pub/centos6/kvm
lang en_US.UTF-8
keyboard us
network --device=eth0 --mtu=1500 --bootproto=dhcp --hostname=111111
rootpw  --iscrypted $6$1T62zwS1ovhfGXUW0TGm1JTg1eR8v/P/eKOUvkJmxkQk5ckKd
    /
firewall --service=ssh
authconfig --enableshadow --passalgo=sha512 --enablefingerprint
selinux --permissive
timezone --utc Asia/Taipei
bootloader --location=mbr --driveorder=vda --append="crashkernel=auto"
# The following is the partition information you requested
# Note that any partitions you deleted are not expressed
# here so unless you clear all partitions first, this is
# not guaranteed to work
services --disabled=anacron
reboot

zerombr yes
clearpart --all
clearpart --drives=vda
ignoredisk --only-use=vda

part /boot --fstype=ext4 --size=96
part pv.01 --size=1100
part pv.02 --size=130
volgroup vg_kvmusb --pesize=4096 pv.01
logvol / --fstype=ext4 --name=root --vgname=vg_kvmusb --size=1000 #--
    grow
logvol swap --name=swap --vgname=vg_kvmusb --size=48 #--grow --maxsize
    =96
```

```
35 volgroup vg_kvmhome --pesize=2048 pv.02
   logvol /home --fstype=ext4 --name=vo --vgname=vg_kvmhome --size=80 #--
       grow --maxsize=144
37
   %packages --nobase
39 #@core
   %include /tmp/kvmpack
41 %end

43 %pre
   wget --tries=1 ftp://192.168.122.1/pub/centos6/add/gvmpack -O /tmp/
       kvmpack
45 n=$(cat -n /tmp/kvmpack | grep '#kvm_add' | awk '{print $1}')
   a=$(echo $n| sed 's/\ /,/')
47 sed -i "${a}d" /tmp/kvmpack
   %end
49
   %post --nochroot
51 cp /var/ftp/pub/kvm.html $INSTALL_ROOT/var/ftp/pub
   %end
53
   %post
55 rm -f /etc/yum.repos.d/*.repo
   cd /boot/grub
57 tf="grub.conf"
   sed -i 's/^title/title KVM/' $tf
59 sed -i 's/^splashimage/#splashimage/' $tf
   sed -i 's/^timeout=5/timeout=30/' $tf
61 ln -sf grub.conf menu.lst
   %end
```

2. 驗證 kickstart file 語法是否正確？顯示第 22 行命令 zerombr，不能有任何參數。

```
[root@dywH add]# ksvalidator kvm-ks.cfg
2 The following problem occurred on line 22 of the kickstart file:

4 Kickstart command zerombr does not take any arguments
```

3. 刪除第 25 行命令 zerombr 後的 yes 參數，再驗證。

```
[root@dywH add]# sed -i 's/^\(zerombr\).*/\1/' kvm-ks.cfg
2 [root@dywH add]# ksvalidator kvm-ks.cfg
```

3.4 Debug

1. 自動安裝 CentOS 時指定的 repo server 爲 ftp server 時，在開始安裝套件前出現”Starting Packages Installation Process”，要等非常久，但若爲 http server 就不會有這樣的問題。
2. 即使 vsftpd 服務已設定爲被動式且指定資料傳輸 ports，問題還是存在。
3. 原因：很多台同時安裝時 ftp server 的資料傳輸 ports 設定不够，造成擁塞。

3.5 問題解決

1. 無法完成安裝，過程出現如下訊息：

```
(anaconda:1224): WARNING **: could not open X-Display
```

2. 檢查 %package section 套件是否重複。

```
[root@dywmac centos6]# grep krb5 add/kvm5pack
krb5-libs
krb5-server
krb5-workstation
pam_krb5
krb5-workstation
```

3.6 GPT Part

1. bootloader –location=partition 無法執行，還是要設定爲 mbr。

```
bootloader --location=mbr #--driveorder=vda
```

2. clearpart –disklabel=gpt 指定以 GPT 分割表分割硬碟。

```
clearpart --all --initlabel --disklabel=gpt
```

3. 如果直接設定 /boot 分割區爲 biosboot，kickstart 回應空間太大，所以 size 1M 的 biosboot 分割區還是要設定。

```
part biosboot --fstype=biosboot --size=1
```

4. 爲了讓 /boot/efi 分割區在 pv.01 之前，加入參數 -asprimary，否則 efi 分割區會在最後一個分割區。

```
part /boot/efi --fstype=efi --size=50 --label=crt-efi --asprimary
part /boot --fstype=ext4 --size=480 --label=crt-boot --asprimary
part pv.01 --size=27000
volgroup vg_crt --pesize=4096 pv.01
logvol / --fstype=xfs --name=root --vgname=vg_crt --size=24000
logvol swap --name=swap --vgname=vg_crt --size=1024
```

Chapter 4

安裝來源設計

4.1 CD-ROM6

4.2 USB 隨身碟

1. 安裝 syslinux 套件

```
yum install syslinux
```

2. 建立 USB 開機分割區

   (a) 先確定隨身碟掛載位置，假設是 /dev/sdh。

```
1 fdisk /dev/sdh -uc
```

   (b) 進入 fdisk 工作畫面後，輸入 n p 1 Enter +2G a 1 p w
   +2G 爲分割區大小，可依自己需要變化
   a 爲設定該分割區爲可開機磁區

   (c) 增加分割區地圖

```
1 kaprtx -av /dev/sdh1
```

3. 複製開機記錄 (MBR) 至 USB 隨身碟

```
1 dd if=/usr/share/syslinux/mbr.bin of=/dev/sdh
```

4. 格式化 USB 隨身碟：分割區不使用日誌檔案格式，故格式化爲 ext2。

```
mkfs.ext2 -m 0 -L "Custom Boot" /dev/sdh1
```

5. 掛載 USB 隨身碟

   (a) 建立隨身碟掛載目錄，假設是 /mnt/usb

```
mkdir /mnt/usb
```

   (b) 掛載

```
mount /dev/sdh1 /mnt/usb
```

6. 複製 iso 至 USB 隨身碟

   (a) 如何已經製作好 iso，假設是 crt.iso

```
cp crt.iso /mnt/usb
```

   (b) 沒有 iso，先改變工作目錄至安裝資料所在目錄，假設工作目錄爲 /usr/src/usb，再製作 iso。

```
mkisofs -o /mnt/usb/crt.iso -b isolinux/isolinux.bin \
 -c isolinux/boot.cat -no-emul-boot -boot-load-size 4 \
 -boot-info-table -R -J -v -T /usr/src/usb
```

7. 複製開機安裝所需檔案至 USB 隨身碟

```
cp -a images /mnt/usb
cp -a isolinux /mnt/usb
cp -a .treeinfo /mnt/usb
cp -a .discinfo /mnt/usb
cp -a LiveOS /mnt/usb  ## CentOS 7
```

8. 變更開機安裝設定檔名稱

   (a) CentOS 6

```
cd /mnt/usb
mv isolinux extlinux
cd extlinux
mv isolinux.cfg extlinux.conf
```

(b) CentOS 7

```
cd /mnt/usb
mv isolinux syslinux
cd syslinux
mv isolinux.bin syslinux.bin
mv isolinux.cfg syslinux.cfg
```

9. 修改 USB 隨身碟開機設定檔

```
# 重點爲自動安裝檔的位置 ks= ，及安裝套件庫的位置 repo=
# 此例子 hd:UUID='xxxxxxxxx' 指的是隨身碟本身
# 分割區 UUID 查詢可用 blkid /dev/sdh1
```

(a) CentOS 6

```
label crt
  menu label Install ^Certification system
  menu default
  kernel vmlinuz
  append load_ramdisk=1 initrd=initrd.img \
    ks=hd:UUID="ef08a3ae-eb70-4a55-a31e-e68cdcceaec9":/extlinux/crt
        -ks.cfg \
    repo=hd:UUID="ef08a3ae-eb70-4a55-a31e-e68cdcceaec9":/centos6
```

(b) CentOS 7 (使用 UUID 時不要雙引號括起號)

```
  menu label ^Install CentOS 7 ELK Server-1
  menu default
  kernel vmlinuz
  append initrd=initrd.img inst.stage2=hd:LABEL=Custom\x20Boot:/
    inst.repo=hd:LABEL=Custom\x20Boot:/ inst.ks=hd:LABEL=Custom\
        x20Boot:/add/elk-ks.cfg

  menu label ^Install CentOS 7 ELK Server-2
  menu default
  kernel vmlinuz
  append initrd=initrd.img inst.stage2=hd:UUID=cf08b4eb-559c-4971-
      beb1-811ed1533d9b:/
```

```
11      inst.repo=hd:UUID=cf08b4eb-559c-4971-beb1-811ed1533d9b:/
        inst.ks=hd:UUID=cf08b4eb-559c-4971-beb1-811ed1533d9b:/add/elk-
            ks.cfg
```

10. 安裝開機管理程式至 USB 隨身碟

```
extlinux -i /mnt/usb/
```

11. 以上動作多數在 cache 中，尚未寫入 USB 隨身碟，執行 sync 同步兩者資料

```
1 sync
```

12. 卸載 USB 隨身碟

```
1 umount /mnt/usb
```

4.3 PXE 安裝

1. PXE (Pre-eXecution Environment) 開機設定檔 `isolinux/pxelinux.cfg/default`
2. 在現有且版本相同的 Linux 系統安裝 syslinux 套件。

```
1 [root@kvm5 ~]# yum install tftp syslinux
```

3. 查詢 syslinux 提供的 pxelinux.0。

```
1 [root@kvm5 ~]# rpm -ql syslinux | grep pxelinux.0
/usr/share/syslinux/gpxelinux.0
3 /usr/share/syslinux/pxelinux.0
```

4. 將 syslinux 提供的 pxelinux.0 複製到 PXE 安裝系統中。

```
[root@kvm5 ~]# scp /usr/share/syslinux/pxelinux.0 192.168.122.1:/var/ftp
    /pub/centos7/isolinux/
The authenticity of host '192.168.122.1 (192.168.122.1)' can't be
    established.
RSA key fingerprint is 86:56:db:f9:dc:5b:88:5c:c5:4a:e8:69:0b:68:dd:00.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.122.1' (RSA) to the list of known
    hosts.
root@192.168.122.1's password:
pxelinux.0
```

5. 複製 isolinux 下的 isolinux.cfg 到 pxelinux.cfg/default。

```
cp isolinux.cfg pxelinux.cfg/default
```

6. 修改 pxelinux.cfg/default

```
label crt
  menu label Install ^Certification USB system
  menu default
  kernel vmlinuz
  append vga=normal load_ramdisk=1 initrd=initrd.img network \
    ks=ftp://192.168.111.254/pub/centos6/add/crt-ks.cfg \
    repo=ftp://192.168.111.254/pub/centos6/ noipv6
```

4.4 PXE dhcp tftp -c6

1. PXE 網路安裝需要 dhcp 及 tftp-server 套件

```
[root@dyH ~]# yum install dhcp tftp-server -y
```

2. dhcpd 服務設定並啓動

   (a) 編輯設定檔

```
[root@dyH ~]# vim /etc/dhcp/dhcpd.conf

ddns-update-style none;
option space PXE;

```

```
subnet 192.168.111.0 netmask 255.255.255.0 {
    class "PXE" {
        match if substring(option vendor-class-identifier, 0, 9) =
            "PXEClient";
        option vendor-encapsulated-options 01:04:00:00:00:00:ff;
        option boot-size 0x1;
        filename "pxelinux.0";
        option tftp-server-name "deyu.wang";
        option vendor-class-identifier "PXEClient";
        vendor-option-space PXE;
    }

        #The following lines are standard all of the time.
        option routers 192.168.111.254;
        option subnet-mask 255.255.255.0;
        option domain-name "deyu.wang";
        option domain-name-servers 168.95.1.1,139.175.10.20;
        default-lease-time 21600;
        max-lease-time 43200;

        # Assign IPs 101-100 to PXE clients
        pool {
            allow members of "PXE";
            default-lease-time 120;
            max-lease-time 180;
            range 192.168.111.22 192.168.111.99;
        }
        pool {
            deny members of "PXE";
            range 192.168.111.100 192.168.111.199;
        }
    next-server 192.168.111.254;
    filename "ftp://192.168.111.254/pub/centos6/add/crt-ks.cfg";
}
```

(b) 服務啓動

```
[root@dyH ~]# /etc/init.d/dhcpd restart
```

(c) 看是否需要開機時啓動

```
[root@dyH ~]# chkconfig dhcpd on
```

3. tftp 服務設定及啓動

(a) 編輯設定檔

```
[root@dyH ~]# vim /etc/xinetd.d/tftp

service tftp
{
    socket_type     = dgram
    protocol        = udp
    wait            = yes
    user            = root
    server          = /usr/sbin/in.tftpd
    server_args     = -s /var/ftp/pub/centos6/isolinux  <== pxe
        isolinux 放的位置
    disable         = no   <== 啓動
    per_source      = 11
    cps         = 100 2
    flags           = IPv4
}
```

(b) 服務啓動

```
[root@dyH ~]# /etc/init.d/xinetd restart
```

4. 網路設定

(a) 設定網卡 ethx 的 ip <== 必須與 dhcpd, pxelinux.cfg/default 中設定的相同

```
[root@dyH ~]# ifconfig eth0 192.168.111.254/24
```

(b) 設定 dhcpd 網卡

```
[root@dyH ~]# vim /etc/sysconfig/dhcpd
DHCPDARGS="eth0"
```

4.5 PXE dhcp tftp -c8

1. PXE 網路安裝需要 dhcp-server 及 tftp-server 套件

```
[root@msi ~]# dnf install dhcp-server tftp-server -y
```

2. dhcpd 服務設定檔與上節 c6 相同

3. 複製 dhcpd 服務檔到 /etc/systemd/system 目錄下，其中 $DHCPDARGS 改成 dhcpd 服務監聽的網卡，此例爲 ens3。

```
[root@msi ~]# cp -f /usr/lib/systemd/system/dhcpd.service /etc/systemd/
    system/dhcpd.service
[root@msi ~]# cat /etc/systemd/system/dhcpd.service
[Unit]
Description=DHCPv4 Server Daemon
Documentation=man:dhcpd(8) man:dhcpd.conf(5)
Wants=network-online.target
After=network-online.target
After=time-sync.target

[Service]
Type=notify
EnvironmentFile=-/etc/sysconfig/dhcpd
ExecStart=/usr/sbin/dhcpd -f -cf /etc/dhcp/dhcpd.conf -user dhcpd -group
     dhcpd --no-pid ens3
StandardError=null

[Install]
WantedBy=multi-user.target
```

4. 複製 tftp service 及 socket 檔到 /etc/systemd/system 目錄下，其中 /var/lib/tftpboot 爲 tftp server 的根目錄，可依自己的設定修改。

```
[root@msi ~]# cp /usr/lib/systemd/system/tftp.service /etc/systemd/
    system/tftp.service
[root@msi ~]# cp /usr/lib/systemd/system/tftp.socket /etc/systemd/system
    /tftp.socket

[root@msi ~]# cat /etc/systemd/system/tftp.service
[Unit]
Description=Tftp Server
Requires=tftp.socket
Documentation=man:in.tftpd

[Service]
ExecStart=/usr/sbin/in.tftpd -s /var/lib/tftpboot
StandardInput=socket

[Install]
Also=tftp.socket
```

5. 重新載入 daemon，並重新啓動服務。

```
[root@msi ~]# systemctl daemon-reload
[root@msi ~]# systemctl restart dhcpd
[root@msi ~]# systemctl restart tftp.*
```

6. PXE 爲內網安裝，將 dhcpd 監聽的網卡加到 zone internal，internal 開啓 tftp, ftp, dhcp 服務。

```
[root@msi ~]# firewall-cmd --zone=internal --add-interface=ens3
[root@msi ~]# firewall-cmd --zone=internal --add-service=tftp
[root@msi ~]# firewall-cmd --zone=internal --add-service=ftp
[root@msi ~]# firewall-cmd --zone=internal --add-service=dhcp
```

4.6 PXE Boot 問題處理

1. PXE 安裝時若有問題，要注意 iptables 及 selinux 是否阻擋？
2. PXE 無法取得 DHCP ip：`ping 192.168.1.253` 檢查限制使用的 ip 192.168.1.253 是否被佔用。

```
PXE-E51 "No DHCP or DHCP Proxy Offers received"
```

3. PXE 取得 DHCP ip 接著 tftp 出現錯誤訊息，可能是 NetworkManager 作怪，使用 pxe 安裝時，建議關閉 NetworkManager，只使用 network 網路服務。

```
PXE-E32: TFTP open timeout
```

4. PXE 安裝時 `repo=nfs:192.168.1.254:/var/ftp/pub/isos`，也就是掛載 nfs 上的 iso 檔，出現以下 iso 檔已成功掛載，但 rpm 套件無法開啓問題，應該是 iso 檔有問題，請重新下載 iso 檔。使用 rsync 同步檔案並無法解決 iso 檔問題，要直接複製。

```
The file [name of a .rpm file] cannot be opened. This is due to a
    missing file, a corrput package or corrupt media. Please verify your
     installation source.
```

```
3 If you exit, your system will be left in an inconsistent state that will
      likely require reinstallation.

5 Reboot | Retry
```

5. 若 kickstart 檔案設定的網路 ip 爲 192.168.1.253，但 dhcp 卻無法取得此 ip，會造成通過 dhcp, tftp 後 nfs 無法掛載，而無法繼續安裝。

   (a) kickstart 檔中的網路設定

```
1 network --bootproto static --ip 192.168.1.253 --netmask
      255.255.255.252 --nameserver 192.168.1.254 --hostname deyu.wang
```

   (b) dhcp 設定檔 pxe 取得 ip 範圍。

```
1         # Assign IPs 200-253 to PXE clients
          pool {
3             allow members of "PXE";
              default-lease-time 120;
5             max-lease-time 180;
              range 192.168.1.200 192.168.1.253;
7         }
```

   (c) pxe 安裝過程 192.168.1.253 無法連線的錯誤訊息。

```
1 iBFT doesn't couldn't provide valid nic mac address.
```

Chapter 5

Live CD 製作

5.1 簡介

1. Live CD 又稱自生系統，是事先儲存於某種可移動儲存裝置上，不用安裝、可開機的作業系統，運行電腦的記憶體。
2. 採用的介質包括 CD-ROM（Live CD），DVD（Live DVD），隨身碟（Live USB）甚至是軟碟等。
3. 自生系統常被設計成用於展示軟硬體的客製作業系統。
4. 一些自生系統會包含安裝工具，可以由桌面的圖示來啓動，啓動後可以將作業系統安裝到系統的硬碟或是 USB 裝置。
5. WIKI Live CD

5.2 產生 Live CD

1. 安裝 livecd yum server

```
vim /etc/yum.repos.d/dywang.repo
[dywang]
name=De-Yu Wang
baseurl=http://dywang.csie.cyut.edu.tw/centos6
enabled=1
gpgcheck=0
```

2. 安裝 livecd 工具套件

```
yum install livecd-tools pykickstart
```

3. live cd kickstart file 例子 crtlivecd-ks.cfg

```
#version=DYW6
install
graphical
xconfig --startxonboot
lang en_US.UTF-8
keyboard us
network --device=eth0 --mtu=1500 --bootproto=dhcp --hostname=deyu.wang
rootpw 123123
firewall --service=ssh
authconfig --enableshadow --passalgo=sha512 --enablefingerprint
selinux --permissive
timezone --utc Asia/Taipei
# The following is the partition information you requested
# Note that any partitions you deleted are not expressed
# here so unless you clear all partitions first, this is
# not guaranteed to work
#services --disabled=anacron

repo --name="DE-YU WANG"  --baseurl=file:///var/ftp/pub/centos6/

%packages --nobase
@core
%end

%post
/usr/sbin/useradd dywang
/bin/echo 'dywang' | /usr/bin/passwd --stdin dywang
#Create a file
cat > /home/dywang/livecdtest << EOF
dir \$LIVE_ROOT
dir \$INSTALL_ROOT
file test end
EOF

cd /home/dywang/
#Download with network
wget ftp://192.168.122.1/pub/kvm.html
%end

%post --nochroot
cp /var/ftp/pub/kvm.html $INSTALL_ROOT/home/dywang
%end
```

4. 產生 live cd

```
livecd-creator --config=crtlivecd-ks.cfg --fslabel=crtlivecd --tmpdir=/
    var/tmp

#--config=crtlivecd-ks.cfg : 自動產生 live cd 的設定檔爲 crtlivecd-ks.
    cfg
#--fslabel=crtlivecd : 產生 live cd iso 檔檔名爲 crtlivecd.iso
#--tmpdir=/var/tmp : 建立 live cd iso 檔前試安裝的暫存目錄，
#  若不指定 --tmpdir，則預設爲 /var/tmp，暫存目錄的空間大小必須大於系統
    所需空間。
(4G以上)
```

Part II

開機修改

Chapter 6

CentOS 8 UEFI 開機

6.1 前言

1. 硬碟分割有兩種模式：
   (a) 傳統 MBR：分割表主要開機區 (Master boot record, MBR) 佔 446 bytes，而 partition table 則佔有 64 bytes。
   (b) 新型 GPT：分割表除了分割數量擴充較多之外，支援的磁碟容量也可以超過 2TB。
2. 傳統 BIOS/MBR 模式硬碟容量只能抓到 2TB，系統碟超過 2TB 一定要用新型 GPT 模式。
3. 開機模式：
   (a) 傳統 BIOS
   (b) EFI 是 Extensible Firmware Interface（可擴展韌體介面）的縮寫，與傳統 BIOS 相比，EFI 較 BIOS 更易於實現，容錯和糾錯特性更強。
   (c) UEFI 則是 Unified Extensible Firmware Interface（統一可擴展韌體介面），與傳統 BIOS 相比，UEFI 對於新硬體的支持更高。
   (d) 現在大多數的電腦預設 UEFI 開機。

6.2 gdisk efi 分割區

1. gdisk 分割 USB 隨身碟 /dev/sdb，分割 EF00 的 EFI System 開機區。

```
1 [root@dyw1 ~]# gdisk /dev/sdb
  GPT fdisk (gdisk) version 1.0.3
3
```

```
Partition table scan:
  MBR: protective
  BSD: not present
  APM: not present
  GPT: present

Found valid GPT with protective MBR; using GPT.

Command (? for help): n
Partition number (1-128, default 1):
First sector (34-61767646, default = 2048) or {+-}size{KMGTP}:
Last sector (2048-61767646, default = 61767646) or {+-}size{KMGTP}: +100
    M
Current type is 'Linux filesystem'
Hex code or GUID (L to show codes, Enter = 8300): ef00
Changed type of partition to 'EFI System'

Command (? for help): n
Partition number (2-128, default 2):
First sector (34-61767646, default = 206848) or {+-}size{KMGTP}:
Last sector (206848-61767646, default = 61767646) or {+-}size{KMGTP}:
    +500M
Current type is 'Linux filesystem'
Hex code or GUID (L to show codes, Enter = 8300): ef02
Changed type of partition to 'BIOS boot partition'

Command (? for help): n
Partition number (3-128, default 3):
First sector (34-61767646, default = 1230848) or {+-}size{KMGTP}:
Last sector (1230848-61767646, default = 61767646) or {+-}size{KMGTP}:
    +26G
Current type is 'Linux filesystem'
Hex code or GUID (L to show codes, Enter = 8300): 8e00
Changed type of partition to 'Linux LVM'

Command (? for help): p
Disk /dev/sdb: 61767680 sectors, 29.5 GiB
Model: USB Flash Drive
Sector size (logical/physical): 512/512 bytes
Disk identifier (GUID): B9DE9231-21B1-42DB-BB35-CD774FD870E1
Partition table holds up to 128 entries
Main partition table begins at sector 2 and ends at sector 33
First usable sector is 34, last usable sector is 61767646
Partitions will be aligned on 2048-sector boundaries
Total free space is 6012861 sectors (2.9 GiB)

Number  Start (sector)    End (sector)  Size       Code  Name
   1            2048          206847   100.0 MiB   EF00  EFI System
   2          206848         1230847   500.0 MiB   EF02  BIOS boot
      partition
   3         1230848        55756799   26.0 GiB    8E00  Linux LVM

Command (? for help): w

```

```
Final checks complete. About to write GPT data. THIS WILL OVERWRITE
    EXISTING
PARTITIONS!!

Do you want to proceed? (Y/N): y
OK; writing new GUID partition table (GPT) to /dev/sdb.
Warning: The kernel is still using the old partition table.
The new table will be used at the next reboot or after you
run partprobe(8) or kpartx(8)
The operation has completed successfully.
```

6.3 格式化分割區

1. 分割規劃如下：

```
[root@dyw1 ~]# gdisk -l /dev/sdb
GPT fdisk (gdisk) version 1.0.3

Partition table scan:
  MBR: protective
  BSD: not present
  APM: not present
  GPT: present

Found valid GPT with protective MBR; using GPT.
Disk /dev/sdb: 61767680 sectors, 29.5 GiB
Model: USB Flash Drive
Sector size (logical/physical): 512/512 bytes
Disk identifier (GUID): B9DE9231-21B1-42DB-BB35-CD774FD870E1
Partition table holds up to 128 entries
Main partition table begins at sector 2 and ends at sector 33
First usable sector is 34, last usable sector is 61767646
Partitions will be aligned on 2048-sector boundaries
Total free space is 6012861 sectors (2.9 GiB)

Number  Start (sector)    End (sector)  Size       Code  Name
   1            2048          206847   100.0 MiB   EF00  EFI System
   2          206848         1230847   500.0 MiB   EF02  BIOS boot
      partition
   3         1230848        55756799   26.0 GiB    8E00  Linux LVM
```

2. 以 vfat 格式化分割區 /dev/sdb1。

```
[root@dyw1 ~]# mkfs.vfat /dev/sdb1
mkfs.fat 4.1 (2017-01-24)
```

3. 以 ext4 格式化分割區 /dev/sdb2。

```
[root@dyw1 ~]# mkfs.ext4 /dev/sdb2
mke2fs 1.45.6 (20-Mar-2020)
Creating filesystem with 512000 1k blocks and 128016 inodes
Filesystem UUID: 6a58db34-95e8-4c84-aea1-8ee1d6c3d060
Superblock backups stored on blocks:
    8193, 24577, 40961, 57345, 73729, 204801, 221185, 401409

Allocating group tables: done
Writing inode tables: done
Creating journal (8192 blocks): done
Writing superblocks and filesystem accounting information: done
```

4. LVM 管理 /dev/sdb3，建立 VG vg_crt，兩個 LV root, swap 。

```
[root@dyw1 ~]# pvcreate /dev/sdb3
  Physical volume "/dev/sdb3" successfully created.
[root@dyw1 ~]# vgcreate vg_crt /dev/sdb3
  Volume group "vg_crt" successfully created
[root@dyw1 ~]# lvcreate -L 20G -n root vg_crt
  Logical volume "root" created.
[root@dyw1 ~]# lvcreate -L 2G -n swap vg_crt
  Logical volume "swap" created.
[root@dyw1 ~]# lvs vg_crt
  LV   VG     Attr       LSize  Pool Origin Data.....
  root vg_crt -wi-a----- 20.00g
  swap vg_crt -wi-a-----  2.00g
```

5. 以 xfs 格式化 LV /dev/vg_crt/root ，。

```
[root@dyw1 ~]# mkfs.xfs /dev/vg_crt/root
meta-data=/dev/vg_crt/root       isize=512    agcount=4, agsize=1310720
    blks
         =                       sectsz=512   attr=2, projid32bit=1
         =                       crc=1        finobt=1, sparse=1, rmapbt
             =0
         =                       reflink=1
data     =                       bsize=4096   blocks=5242880, imaxpct=25
         =                       sunit=0      swidth=0 blks
naming   =version 2              bsize=4096   ascii-ci=0, ftype=1
log      =internal log           bsize=4096   blocks=2560, version=2
         =                       sectsz=512   sunit=0 blks, lazy-count=1
realtime =none                   extsz=4096   blocks=0, rtextents=0
```

6. 格式化 LV /dev/vg_crt/swap 爲 swap。

```
[root@dyw1 ~]# mkswap /dev/vg_crt/swap
Setting up swapspace version 1, size = 2 GiB (2147479552 bytes)
no label, UUID=7eeec893-bd1c-4ae0-b438-424ceb71a054
```

6.4 移機復製檔案

1. 掛載分割好的隨身碟到 /mnt/root 目錄下。

```
[root@dyw1 ~]# mount /dev/vg_crt/root /mnt/root
[root@dyw1 ~]# mkdir /mnt/root/boot
[root@dyw1 ~]# mount /dev/sdb2 /mnt/root/boot
[root@dyw1 ~]# mkdir /mnt/root/boot/efi
[root@dyw1 ~]# mount /dev/sdb1 /mnt/root/boot/efi
```

2. 使用複製檔案系統 cp -ax 方式進行複製。

3. 複製檔案到隨身碟。

```
[root@dyw1 ~]# cp -axr /boot /mnt/root/
[root@dyw1 ~]# cp -axr /boot/efi /mnt/root/boot/
[root@dyw1 ~]# cp -axr / /mnt/root/
```

6.5 chroot 調整系統 - UEFI

1. chroot 前先掛載 proc dev sys 目錄。

```
[root@dyw1 ~]# mount -t proc /proc /mnt/root/proc/
[root@dyw1 ~]# mount --rbind /sys /mnt/root/sys/
[root@dyw1 ~]# mount --rbind /dev /mnt/root/dev
```

2. chroot 到新系統，先在根目錄上產生空檔案 .autorelabel，讓系統第一次開機時重新標示檔案 SELinux type 。

```
[root@dyw1 ~]# chroot /mnt/root
bash-4.4# touch /.autorelabel
```

3. 以下幾個檔，除了 /etc/mtab 爲掛狀況不用改外，其他檔案跟原系統 vg vg_crt 有關，必須先確定是否需要修改？

```
bash-4.4# grep vg_crt -l --exclude-dir=lvm -R /etc 2>/dev/null
/etc/default/grub
/etc/sysconfig/grub
/etc/mtab
/etc/grub2.cfg
/etc/grub2-efi.cfg
/etc/fstab
```

4. 例如：將 /etc 目錄下所有 vg vg_crt 有關的檔案全部修改成新系統 vg 名稱 vg_cs 。

```
bash-4.4# grep vg_crt -l --exclude-dir=lvm -R /etc 2>/dev/null | \
xarg sed -i 's/vg_crt/vg_cs/g'
```

5. 查詢 /boot 目錄下跟 vg vg_crt 有關的檔案。

```
bash-4.4# grep -lIR cyber /boot
/boot/efi/EFI/almalinux/grub.cfg
/boot/efi/EFI/BOOT/grub.cfg
/boot/loader/entries/dce60614bb87f47229a75ba1d538484b-0-rescue.conf
/boot/loader/entries/dce60614bb87f47229a75ba1d538484b-5.14.0-70.22.1.
    el9_0.x86_64.conf
/boot/grub2/grub.cfg
```

6. 將 /boot 目錄中所有檔案中的 vg_crt ，改成新系統 vg 名稱 vg_cs 。

```
bash-4.4# grep -lIR vg_crt /boot | xarg sed -i 's/vg_crt/vg_cs/g'
```

7. 查詢原系統開機使用 UUID 的分割區。

```
bash-4.4# grep UUID /etc/fstab
UUID="058b18ea-9ae1-4d4e-be1e-44195edec185" /boot xfs    defaults
    1 2
UUID="8C7E-75C0"          /boot/efi           vfat    defaults       1 2
```

8. 查詢新系統要掛載在 /boot 及 /boot/efi 的分割區之 UUID。

```
bash-4.4# blkid /dev/sdb2
/dev/sdb2: UUID="6a58db34-95e8-4c84-aea1-8ee1d6c3d060" BLOCK_SIZE="1024"
TYPE="xfs" PARTLABEL="BIOS boot partition"
PARTUUID="6e18a25d-c48c-40ec-98cd-64851a928dd9"
bash-4.4# blkid /dev/sdb2
/dev/sdb1: SEC_TYPE="msdos" UUID="ED77-1371" BLOCK_SIZE="512" TYPE="vfat
    "
PARTLABEL="EFI system partition" PARTUUID="cda6653d-5a61-428f-a7fa-3
    fb7eb86e9bd"
```

9. 更新掛載 /boot 及 /boot/efi 的分割區之 UUID。

```
bash-4.4# sed -i 's/old_boot_uuid/new_boot_uuid/g' /etc/fstab
bash-4.4# sed -i 's/old_efi_uuid/new_efi_uuid/g' /etc/fstab
```

10. 查詢更新後的掛載 /boot 及 /boot/efi 的分割區之 UUID。

```
bash-4.4# grep UUID /etc/fstab
UUID="6a58db34-95e8-4c84-aea1-8ee1d6c3d060" /boot   xfs     defaults
    1 2
UUID="ED77-1371"          /boot/efi           vfat    defaults        1 2
```

11. /boot 目錄下有很多開機檔案，一樣會用到 /boot 及 /boot/efi 掛載點的 UUID，一併更新。

```
bash-4.4# grep 'old_boot_uuid' -R /boot -l
/boot/efi/EFI/almalinux/grub.cfg
/boot/efi/EFI/BOOT/grub.cfg
/boot/grub2/grub.cfg
bash-4.4# grep 'old_boot_uuid' -lR /boot | xarg sed -i 's/old_boot_uuid/
    new_boot_uuid/g'
bash-4.4# grep 'old_efi_uuid' -lR /boot | xarg sed -i 's/old_efi_uuid/
    new_efi_uuid/g'
```

12. /boot/loader/entries/ 目錄存放開機選項。

```
bash-4.4# ls /boot/loader/entries/
fb2be566df51b1048007ce7567d5226a-0-rescue.conf
fb2be566df51b1048007ce7567d5226a-5.14.0-1.el8.elrepo.x86_64.conf
```

13. 如果依以上方式修改檔案，以下步驟可以不用做。

14. 安裝 efi 開機套件。

```
bash-4.4# dnf install grub2-efi-x64
bash-4.4# dnf install shim
```

15. 產生開機選單。

```
bash-4.4# grub2-mkconfig -o /boot/efi/EFI/centos/grub.cfg
Generating grub configuration file ...
Adding boot menu entry for EFI firmware configuration
done
```

6.6 chroot 調整系統 - MBR

1. gdisk 查看開機硬碟 /dev/sda 的分割狀況，/dev/sda2 的掛載 /boot 的開機目錄。

```
bash-4.4# gdisk -l /dev/sda
GPT fdisk (gdisk) version 1.0.3

Partition table scan:
  MBR: protective
  BSD: not present
  APM: not present
  GPT: present

Found valid GPT with protective MBR; using GPT.
Disk /dev/sda: 937703088 sectors, 447.1 GiB
Model: INTEL SSDSC2BW48
Sector size (logical/physical): 512/512 bytes
Disk identifier (GUID): 2CC0140B-213C-4298-ADF8-603284119E49
Partition table holds up to 128 entries
Main partition table begins at sector 2 and ends at sector 33
First usable sector is 34, last usable sector is 937703054
Partitions will be aligned on 2048-sector boundaries
Total free space is 3693 sectors (1.8 MiB)

Number  Start (sector)    End (sector)  Size       Code  Name
   1            2048           43007   20.0 MiB    EF00  EFI System
   2           43008         1026047   480.0 MiB   EF02  BIOS boot
       partition
   3         1026048       937701375   446.6 GiB   8E00  Linux LVM
```

2. parted 將 /dev/sda2 分割區的 flags boot 關閉，bios_grub 開啓。

```
bash-4.4# parted /dev/sda
GNU Parted 3.2
Using /dev/sda
Welcome to GNU Parted! Type 'help' to view a list of commands.
(parted) set 2 boot off
(parted) set 2 bios_grub on
(parted) q
Information: You may need to update /etc/fstab.
```

3. grub2-install 安裝 bios 開機到硬碟，此例爲 /dev/sda。若硬碟由其他系統管理，例如還原卡，則必須安裝到 bios boot 分割區，此例爲 /dev/sda2，無法安裝時可使用 -force 選項強制安裝。

```
bash-4.4# grub2-install --target=i386-pc /dev/sda
```

4. 退出系統。

```
bash-4.4# exit
exit
```

5. RHEL9 測試，如上第 2 個 partition 設定爲 BIOS boot partition，grub2-install 後這個 partition 無法掛載且無法開機，必須另外新增大小 1M 的第 1 個 BIOS boot partition，再 grub2-install，則 BIOS 及 UEFI 開機都沒問題。

```
```

6.7 原系統增加 UEFI 開機

1. gdisk 新增 efi 開機分割區。

```
[root@deyu ~]# gdisk /dev/vda
GPT fdisk (gdisk) version 1.0.3

Partition table scan:
  MBR: MBR only
  BSD: not present
  APM: not present
```

```
  GPT: not present


********************************************************************
Found invalid GPT and valid MBR; converting MBR to GPT format
in memory. THIS OPERATION IS POTENTIALLY DESTRUCTIVE! Exit by
typing 'q' if you don't want to convert your MBR partitions
to GPT format!
********************************************************************


Command (? for help): p
Disk /dev/vda: 62914560 sectors, 30.0 GiB
Sector size (logical/physical): 512/512 bytes
Disk identifier (GUID): 00720AF6-AAFE-4232-A78D-8E6D57DFF7A6
Partition table holds up to 128 entries
Main partition table begins at sector 2 and ends at sector 33
First usable sector is 34, last usable sector is 62914526
Partitions will be aligned on 2048-sector boundaries
Total free space is 20930493 sectors (10.0 GiB)

Number  Start (sector)    End (sector)  Size       Code  Name
   1            2048         1026047   500.0 MiB   8300  Linux
       filesystem
   2         1026048        41986047   19.5 GiB    8E00  Linux LVM

Command (? for help): d
Partition number (1-2): 1

Command (? for help): n
Partition number (1-128, default 1):
First sector (34-62914526, default = 41986048) or {+-}size{KMGTP}: 2048
Last sector (2048-1026047, default = 1026047) or {+-}size{KMGTP}: +50M
Current type is 'Linux filesystem'
Hex code or GUID (L to show codes, Enter = 8300): ef00
Changed type of partition to 'EFI System'

Command (? for help): p
Disk /dev/vda: 62914560 sectors, 30.0 GiB
Sector size (logical/physical): 512/512 bytes
Disk identifier (GUID): 00720AF6-AAFE-4232-A78D-8E6D57DFF7A6
Partition table holds up to 128 entries
Main partition table begins at sector 2 and ends at sector 33
First usable sector is 34, last usable sector is 62914526
Partitions will be aligned on 2048-sector boundaries
Total free space is 21852093 sectors (10.4 GiB)

Number  Start (sector)    End (sector)  Size       Code  Name
   1            2048          104447   50.0 MiB    EF00  EFI System
   2         1026048        41986047   19.5 GiB    8E00  Linux LVM

Command (? for help): n
Partition number (3-128, default 3):
First sector (34-62914526, default = 41986048) or {+-}size{KMGTP}:
```

```
   104448
Last sector (104448-1026047, default = 1026047) or {+-}size{KMGTP}:
Current type is 'Linux filesystem'
Hex code or GUID (L to show codes, Enter = 8300): ef02
Changed type of partition to 'BIOS boot partition'

Command (? for help): p
Disk /dev/vda: 62914560 sectors, 30.0 GiB
Sector size (logical/physical): 512/512 bytes
Disk identifier (GUID): 00720AF6-AAFE-4232-A78D-8E6D57DFF7A6
Partition table holds up to 128 entries
Main partition table begins at sector 2 and ends at sector 33
First usable sector is 34, last usable sector is 62914526
Partitions will be aligned on 2048-sector boundaries
Total free space is 20930493 sectors (10.0 GiB)

Number  Start (sector)    End (sector)  Size       Code  Name
   1            2048          104447   50.0 MiB    EF00  EFI System
   2         1026048        41986047   19.5 GiB    8E00  Linux LVM
   3          104448         1026047   450.0 MiB   EF02  BIOS boot
      partition

Command (? for help): w

Final checks complete. About to write GPT data. THIS WILL OVERWRITE
   EXISTING
PARTITIONS!!

Do you want to proceed? (Y/N): y
OK; writing new GUID partition table (GPT) to /dev/vda.
Warning: The kernel is still using the old partition table.
The new table will be used at the next reboot or after you
run partprobe(8) or kpartx(8)
The operation has completed successfully.
```

2. gdisk 查看分割區。

```
[root@deyu ~]# gdisk -l /dev/vda
GPT fdisk (gdisk) version 1.0.3

Partition table scan:
  MBR: protective
  BSD: not present
  APM: not present
  GPT: present

Found valid GPT with protective MBR; using GPT.
Disk /dev/vda: 62914560 sectors, 30.0 GiB
Sector size (logical/physical): 512/512 bytes
Disk identifier (GUID): 00720AF6-AAFE-4232-A78D-8E6D57DFF7A6
Partition table holds up to 128 entries
Main partition table begins at sector 2 and ends at sector 33
```

```
First usable sector is 34, last usable sector is 62914526
Partitions will be aligned on 2048-sector boundaries
Total free space is 20930493 sectors (10.0 GiB)

Number  Start (sector)    End (sector)  Size       Code  Name
   1            2048          104447   50.0 MiB    EF00  EFI System
   2         1026048        41986047   19.5 GiB    8E00  Linux LVM
   3          104448         1026047   450.0 MiB   EF02  BIOS boot
      partition
[root@deyu ~]# gdisk /dev/vda
GPT fdisk (gdisk) version 1.0.3

Partition table scan:
  MBR: protective
  BSD: not present
  APM: not present
  GPT: present

Found valid GPT with protective MBR; using GPT.

Command (? for help): s
You may need to edit /etc/fstab and/or your boot loader configuration!

Command (? for help): w

Final checks complete. About to write GPT data. THIS WILL OVERWRITE
   EXISTING
PARTITIONS!!

Do you want to proceed? (Y/N): y
OK; writing new GUID partition table (GPT) to /dev/vda.
Warning: The kernel is still using the old partition table.
The new table will be used at the next reboot or after you
run partprobe(8) or kpartx(8)
The operation has completed successfully.
```

3. 格式化 efi 分割區。

```
[root@deyu ~]# mkfs.fat /dev/vda1
```

4. 掛載 efi 分割區。

```
[root@deyu ~]# mount /dev/vda1 /boot/efi
```

5. 安裝 efi 相關套件。

```
[root@deyu ~]# dnf install grub2-efi-x64 shim-x64
```

6. 產生開機選單設定檔。

```
[root@deyu ~]# grub2-mkconfig -o /boot/efi/EFI/centos/grub.cfg
Generating grub configuration file ...
done
```

7. 查看 EFI 目錄下的檔案。

```
[root@deyu ~]# ll /boot/efi/EFI/
total 4
drwx------. 2 root root 1024 Jul  4 15:46 BOOT
drwx------. 3 root root 1024 Jul  4 15:46 centos
[root@deyu ~]# ll /boot/efi/EFI/centos/
total 5804
-rwx------. 1 root root     134 Aug  1  2020 BOOTX64.CSV
drwx------. 2 root root    4096 Mar  3 05:03 fonts
-rwx------. 1 root root 2285336 Mar  3 05:03 grubx64.efi
-rwx------. 1 root root 1162400 Aug  1  2020 mmx64.efi
-rwx------. 1 root root 1238416 Aug  1  2020 shimx64-centos.efi
-rwx------. 1 root root 1244496 Aug  1  2020 shimx64.efi
[root@deyu ~]# ll /boot/efi/EFI/BOOT/
total 1572
-rwx------. 1 root root 1244496 Aug  1  2020 BOOTX64.EFI
-rwx------. 1 root root  362264 Aug  1  2020 fbx64.efi
```

Chapter 7

CentOS 6 UEFI 開機

7.1 前言

6.1

7.2 CentOS 6 BIOS 開機

1. 原始的 DYW 系統，USB 開機碟分割狀態。

```
[root@dywmac ~]# fdisk -luc /dev/sdb

Disk /dev/sdb: 31.6 GB, 31625052160 bytes
64 heads, 32 sectors/track, 30160 cylinders, total 61767680 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x55654248

   Device Boot      Start         End      Blocks   Id  System
/dev/sdb1   *        2048      329727      163840   83  Linux
/dev/sdb2          329728    29689855    14680064   8e  Linux LVM
```

2. 備份 /boot 目錄。

```
[root@dywmac ~]# mount /dev/sdb1 /mnt/boot
[root@dywmac ~]# cd /usr/src/
[root@dywmac src]# mkdir efiboot
[root@dywmac src]# cp -a /mnt/boot/* efiboot/
```

7.3 增加 VFAT 分割區

1. 增加一小塊 5M 的 VFAT 分割區，存放 UEFI 開機 efi 檔。

```
[root@dywmac ~]# fdisk -uc /dev/sdb

Command (m for help): p

Disk /dev/sdb: 31.6 GB, 31625052160 bytes
64 heads, 32 sectors/track, 30160 cylinders, total 61767680 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x55654248

   Device Boot      Start         End      Blocks   Id  System
/dev/sdb1   *        2048      329727      163840   83  Linux
/dev/sdb2          329728    29689855    14680064   8e  Linux LVM

Command (m for help): n
Command action
   e   extended
   p   primary partition (1-4)
p
Partition number (1-4): 3
First sector (29689856-61767679, default 29689856):
Using default value 29689856
Last sector, +sectors or +size{K,M,G} (29689856-61767679, default
    61767679): +5M

Command (m for help): t
Partition number (1-4): 3
Hex code (type L to list codes): ef
Changed system type of partition 3 to ef (EFI (FAT-12/16/32))

Command (m for help): p

Disk /dev/sdb: 31.6 GB, 31625052160 bytes
64 heads, 32 sectors/track, 30160 cylinders, total 61767680 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x55654248

   Device Boot      Start         End      Blocks   Id  System
/dev/sdb1   *        2048      329727      163840   83  Linux
/dev/sdb2          329728    29689855    14680064   8e  Linux LVM
/dev/sdb3        29689856    29700095        5120   ef  EFI (FAT
    -12/16/32)

Command (m for help): w
```

2. 格式化新增的 VFAT 分割區 /dev/sdc3。

```
[root@dywmac ~]# mkfs.vfat -F16 -s2 /dev/sdc3
```

7.4 準備 CentOS 6 efidisk

1. CentOS 6 ISO 檔有 efidisk.img 檔，DYW 系統中也有。

```
[root@dywmac ~]# cd /var/ftp/pub/centos6/images/
[root@dywmac images]# ll efidisk.img
-rw-r--r--. 1 root root 33896448 Aug 25  2012 efidisk.img
```

2. 使用 parted 查看 efidisk.img 分割是由 17408 Byte 開始。

```
[root@dywmac images]# parted efidisk.img
GNU Parted 2.1
Using /var/ftp/pub/centos6/images/efidisk.img
Welcome to GNU Parted! Type 'help' to view a list of commands.
(parted) u
Unit?  [compact]? B
(parted) print
Model:  (file)
Disk /var/ftp/pub/centos6/images/efidisk.img: 33896448B
Sector size (logical/physical): 512B/512B
Partition Table: gpt

Number  Start   End        Size       File system  Name
                    Flags
 1      17408B  33879551B  33862144B  fat16        EFI System Partition
     boot

(parted) quit
```

3. 掛載 efidisk.img 中的第一個分割區在 /mnt/efi 目錄。

```
[root@dywmac images]# mount -oloop,offset=17408 efidisk.img /mnt/efi/
```

4. 查看 /mnt/efi 目錄有 UEFI 開機相關檔案。

```
[root@dywmac images]# ll /mnt/efi/
total 2
```

```
drwxr-xr-x. 3 root root 2048 May 13  2010 EFI
[root@dywmac images]# ll /mnt/efi/EFI/BOOT/
total 32900
-rwxr-xr-x. 1 root root      156 May 13  2010 BOOTX64.conf
-rwxr-xr-x. 1 root root   226825 May 13  2010 BOOTX64.efi
-rwxr-xr-x. 1 root root 29881604 May 13  2010 initrd.img
-rwxr-xr-x. 1 root root    63584 May 13  2010 splash.xpm.gz
-rwxr-xr-x. 1 root root  3510976 May 13  2010 vmlinuz
```

7.5 建立 UEFI 開機

1. 將格式化完成的 /dev/sdc3 掛載於 /mnt/efi1。

```
[root@dywmac images]# mkdir /mnt/efi1
[root@dywmac images]# mount /dev/sdc3 /mnt/efi1
```

2. 將 BOOTX64.conf 及 BOOTX64.efi 複製到 /dev/sdc3 的相對目錄中。

```
[root@dywmac images]# mkdir -p /mnt/efi1/EFI/BOOT/
[root@dywmac images]# cp /mnt/efi/EFI/BOOT/BOOTX64.* /mnt/efi1/EFI/BOOT/
```

3. BOOTX64.conf 以 BISO 開機選單檔 grub.conf 覆蓋。

```
[root@dywmac images]# cp /mnt/boot/grub/grub.conf /mnt/efi1/EFI/BOOT/
   BOOTX64.conf
[root@dywmac images]# cat /mnt/efi1/EFI/BOOT/BOOTX64.conf
default=0
timeout 5
hiddenmenu
splashimage=(hd0,0)/grub/splash.xpm.gz
title Red Hat Linux (4.8.12-1.el6.elrepo.x86_64)
    root (hd0,0)
    kernel /vmlinuz-4.8.12-1.el6.elrepo.x86_64 ro root=/dev/mapper/
       vg_crt-root
rd_LVM_LV=vg_crt/root rd_LVM_LV=vg_crt/swap rd_NO_LUKS rd_NO_MD rd_NO_DM
LANG=en_US.UTF-8 SYSFONT=latarcyrheb-sun16 KEYBOARDTYPE=pc KEYTABLE=us
crashkernel=auto scsi_mod.scan=async rhgb quiet
    initrd /initramfs-4.8.12-1.el6.elrepo.x86_64.img
title CRT DYW_Linux (2.6.32-573.el6.x86_64)
    root (hd0,0)
    kernel /vmlinuz-2.6.32-573.el6.x86_64 ro root=/dev/mapper/vg_crt-
       root
rd_LVM_LV=vg_crt/root rd_LVM_LV=vg_crt/swap rd_NO_LUKS rd_NO_MD rd_NO_DM
LANG=en_US.UTF-8 SYSFONT=latarcyrheb-sun16 KEYBOARDTYPE=pc KEYTABLE=us
```

```
crashkernel=auto rhgb quiet
    initrd /initramfs-2.6.32-573.el6.x86_64.img
```

7.6 Grub Install

1. 回復 /boot 目錄。

```
[root@dywmac ~]# mount /dev/sdb1 /mnt/boot
[root@dywmac ~]# cd /usr/src/
[root@dywmac src]# cp -a efiboot/* /mnt/boot/
```

2. 本例是將原掛載在 /boot 目錄的開機分割區 /dev/sdb1 縮小，將空出來的空間分割成 EFI 開機用的 VFAT 分割區。所以即使將原來在 /boot 下的所有檔案複製過去，也可能無法開機，必須重新安裝 grub。

3. 使用隨身碟開機，掛載要修復的硬碟根目錄。

```
[root@deyu ~]# mount /dev/dywIssd/lv_root /mnt/root/
```

4. 掛載 /dev /proc /sys 目錄到要修復的硬碟掛載目錄中。

```
[root@deyu ~]# mount --bind /dev /mnt/root/dev/
[root@deyu ~]# mount --bind /proc /mnt/root/proc
[root@deyu ~]# mount --bind /sys /mnt/root/sys
```

5. chroot 到要修復的硬碟掛載目錄中。

```
[root@deyu ~]# chroot /mnt/root/
[root@deyu /]# mount /dev/sda1 /boot
```

6. 安裝 grub 到要修復的硬碟中。

```
[root@deyu /]# grub-install /dev/sda
```

7. 因 /dev/sda1 重新分割，UUID 已不同，必須修改 /etc/fstab 掛載位置。

```
[root@deyu /]# blkid /dev/sda1
/dev/sda1: UUID="56569a09-f13d-4f36-a9dc-349ea76a17cb" TYPE="ext3"
[root@deyu /]# vim /etc/fstab
[root@deyu /]# grep /boot /etc/fstab
UUID=56569a09-f13d-4f36-a9dc-349ea76a17cb /boot  ext3  defaults  1 2
```

Chapter 8

開機程式及 SquashFS

8.1 initrd.img 簡介

1. 開機設定檔中會指定核心 kernel=/vmlinuz 及 initrd=initrd.img

```
title De-Yu Wang (2.6.32-71.el6.x86_64)
    root (hd0,0)
    kernel /vmlinuz-2.6.32-71.el6.x86_64 ro root=/dev/mapper/vg_dywh-
        root rd_LVM_LV=vg_dywh/root rd_LVM_LV=vg_dywh/swap rd_NO_LUKS
        rd_NO_MD rd_NO_DM LANG=en_US.UTF-8 SYSFONT=latarcyrheb-sun16
        KEYBOARDTYPE=pc KEYTABLE=us crashkernel=auto rhgb quiet
    initrd /initramfs-2.6.32-71.el6.x86_64.img
```

2. Linux 系統開機從 kernel=/vmlinux 取得核心，但放置硬體的驅動程式的分割區還未掛載，爲了支援開機時所需驅動程式。Linux 先建立 initrd (initial ram disk)，包含驅動程式，供開機時暫時掛載。

3. 如果没指定 initrd.img 或者指定的 initrd.img 中没有包含正確的驅動程式模組，系統讀取核心後會出現”kernel panic: VFS: Unable to mount root fs on 08:06” 的錯誤訊息。

8.2 產生或取得 initrd.img

1. 從下載的光碟中取得6

2. 從現有的 Linux 系統產生，若要提供 PXE 安裝，製作前先安裝套件 dracut-network。

```
[root@dywH ~]# yum install dracut-network
```

3. 建立暫存工作目錄

```
[root@dyH ~]# mkdir initrdtmp
[root@dyH ~]# cd initrdtmp
```

4. mkinitrd 產生目前模組版本的 initrd image 檔 initrd.dyw.img。

```
[root@dyH initrdtmp]# mkinitrd  ./initrd.dyw.img `uname -r`
```

5. 查看產生的檔案。

```
[root@dyH initrdtmp]# ll
total 34904
-rw-r--r--. 1 root root 35739648 Jul 31 14:17 initrd.dyw.img
```

8.3 修改映像檔 initrd.img

1. initrd.img 其實是一個壓縮

```
[root@dyH initrdtmp]# mv initrd.dyw.img initrd.dyw.gz
[root@dyH initrdtmp]# gunzip initrd.dyw.gz
[root@dyH initrdtmp]# ll
total 34904
-rw-r--r--. 1 root root 35739648 Jul 31 14:17 initrd.dyw
```

2. 使用 cpio 抽取檔案

```
[root@dyH initrdtmp]# mkdir tmp2
[root@dyH initrdtmp]# cd tmp2/
[root@dyH tmp2]# cpio -id < ../initrd.dyw
69804 blocks
```

3. 看到 initrd.dyw.img 內容，可進行修改

```
[root@dyH tmp2]# ls
bin      emergency  initqueue           lib    pre-pivot    proc
   sysroot  var
cmdline  etc        initqueue-finished  lib64  pre-trigger  sbin  tmp
dev      init       initqueue-settled   mount  pre-udev     sys   usr
```

4. 修改系統版本宣告

```
[root@dyH tmp2]# vim etc/system-release
De-Yu Wang Linux 6.0 release (Taiwan)
```

5. dracut 預設只將開機需要的核心模組加入，可經由修改 /etc/dracut.conf 增加驅動程式、核心模組，也可以於下命令時加入。使用 USB 硬碟於筆電開機，經常無法正常開機的原因，往往是 initramfs 沒有適用的驅動程式，在不確定是那些驅動程式或模組必須載入的情況下，想要讓隨身硬碟開機，可以將所有的核心模組加到 initramfs 中，雖然會讓 initramfs 檔案變大且開機速度變慢，但至少可以正常開機。

```
[root@dywnb tmp2]# cp -a /lib/modules/4.6.2-1.el6.elrepo.x86_64 lib/
   modules/
```

6. 最後找到將如下 modules.* 檔，kernel/drivers 下 usb 目錄，加到 initramfs 中不但可在 hp probook 430 開機且不影響開機速度。

```
[root@dywnb ~]# cd /usr/src/tmp1/
[root@dywnb tmp1]# rsync -av /lib/modules/4.8.1-1.el6.elrepo.x86_64/
   modules.* \
lib/modules/4.8.1-1.el6.elrepo.x86_64/
[root@dywnb tmp1]# rsync -av /lib/modules/4.8.1-1.el6.elrepo.x86_64/
   kernel/drivers/usb \
lib/modules/4.8.1-1.el6.elrepo.x86_64/kernel/drivers/

[root@dywnb tmp1]# find . | cpio --create --format='newc' > ../initramfs
   -4.8.1.m
[root@dywnb tmp1]# gzip --force ../initramfs-4.8.1.m
[root@dywnb tmp1]# /bin/cp ../initramfs-4.8.1.m.gz /media/crt-boot/
   initramfs-4.8.1-1.el6.elrepo.x86_64.img ; sync
```

8.4 重建映像檔 initrd.img

1. 將修改好後的檔案，集結成一個檔

```
[root@dyH tmp2]# find . | cpio --create --format='newc' > ../newinitrd
69804 blocks
[root@dyH tmp2]# ls ../
initrd.dyw  newinitrd  tmp2
[root@dyH tmp2]# ll ../newinitrd
-rw-r--r--. 1 root root 35739648 Jul 31 20:46 ../newinitrd
```

2. 壓縮 newinitrd

```
[root@dyH tmp2]# cd ..
[root@dyH initrdtmp]# gzip newinitrd
[root@dyH initrdtmp]# ll
total 46948
-rw-r--r--.  1 root root 35739648 Jul 31 14:17 initrd.dyw
-rw-r--r--.  1 root root 12327411 Jul 31 20:46 newinitrd.gz
drwxr-xr-x. 23 root root     4096 Jul 31 20:31 tmp2
```

3. 修改 newinitrd.gz 的副檔名

```
[root@dyH initrdtmp]# mv newinitrd.gz newinitrd.img
[root@dyH initrdtmp]# ll
total 46948
-rw-r--r--.  1 root root 35739648 Jul 31 14:17 initrd.dyw
-rw-r--r--.  1 root root 12327411 Jul 31 20:46 newinitrd.img
drwxr-xr-x. 23 root root     4096 Jul 31 20:31 tmp2
```

8.5 支援 USB 開機的 initramfs

1. mkinitrd 預載模組

```
mkinitrd /boot/initramfs-4.18.20-1.el6.elrepo.x86_64.img\
 4.18.20-1.el6.elrepo.x86_64 --preload xfs:ext4:usbcore:\
sd_mod:ehci_hcd:uhci_hcd:ohci_hcd:usb-storage:scsi_mod --force
```

8.6 SquashFS 修改 install.img

1. 從下載的光碟中取得6

```
[root@dyH ~]# mkdir tmp
[root@dyH ~]# cd tmp
[root@dyH tmp]# cp /var/ftp/pub/centos6/images/install.img .
[root@dyH tmp]# ll install.img
-rw-r--r--. 1 root root 118886400 Aug  1 08:35 install.img
```

2. SquashFS 檔案系統，可以不浪費任何一個位元，儲存檔案內容。Linux 安裝映像檔 install.img 就是此格式。

3. 安裝 squashfs 工具套件

```
[root@dyH tmp]# yum install squashfs-tools
```

4. 解開 install.img

```
[root@dyH tmp]# unsquashfs install.img
Parallel unsquashfs: Using 4 processors
14011 inodes (15923 blocks) to write

[============================================================-]
    15923/15923 100%
created 9226 files
created 749 directories
created 4783 symlinks
created 0 devices
created 0 fifos
```

5. 查看檔案

```
[root@dyH tmp]# ll
total 163052
-rw-r--r--.  1 root root 118886400 Aug  1 08:35 install.img
drwxr-xr-x. 11 root root      4096 Aug 25  2012 squashfs-root
```

6. 安裝背景圖片存放位置

```
[root@dyH tmp]# cd squashfs-root/
[root@dyH squashfs-root]# ll usr/share/anaconda/pixmaps/s*.png
```

```
-r--r--r--. 3 root root 213694 Aug 24  2012 usr/share/anaconda/pixmaps/
    splash.png
-r--r--r--. 1 root root 288727 Aug 24  2012 usr/share/anaconda/pixmaps/
    syslinux-splash.png
```

7. 取代安裝過程預設背景圖片

```
[root@dyH squashfs-root]# cp /home/dywang/Pictures/dywang6_640x300.png \
    usr/share/anaconda/pixmaps/syslinux-splash.png
[root@dyH squashfs-root]# cp /home/dywang/Pictures/dywang6_640x240.png \
    usr/share/anaconda/pixmaps/splash.png
[root@dyH squashfs-root]# cd usr/share/anaconda/pixmaps
[root@dyH squashfs-root]# ln -f splash.png progress_first.png
[root@dyH squashfs-root]# ln -f splash.png progress_first-lowres.png
```

8. 修改安裝過程預設主題樣式

```
[root@dyH squashfs-root]# sed -i 's/Slider/Clearlooks/g' \
etc/gconf/schemas/metacity.schemas \
etc/gconf/gconf.xml.defaults/%gconf-tree.xml \
etc/gtk-2.0/gtkrc
[root@dyH squashfs-root]# cp -a /usr/share/themes/Clearlooks usr/share/
    themes/
```

9. 重新製作 squashfs 檔案系統的 install.img

```
[root@dyH squashfs-root]# cd ..
[root@dyH tmp]# rm install.img
rm: remove regular file `install.img'? y
[root@dyH tmp]# mksquashfs squashfs-root install.img
Parallel mksquashfs: Using 4 processors
Creating 4.0 filesystem on install.img, block size 131072.
[============================================================-]
    11140/11140 100%
Exportable Squashfs 4.0 filesystem, gzip compressed, data block size
    131072
    compressed data, compressed metadata, compressed fragments,
        compressed x

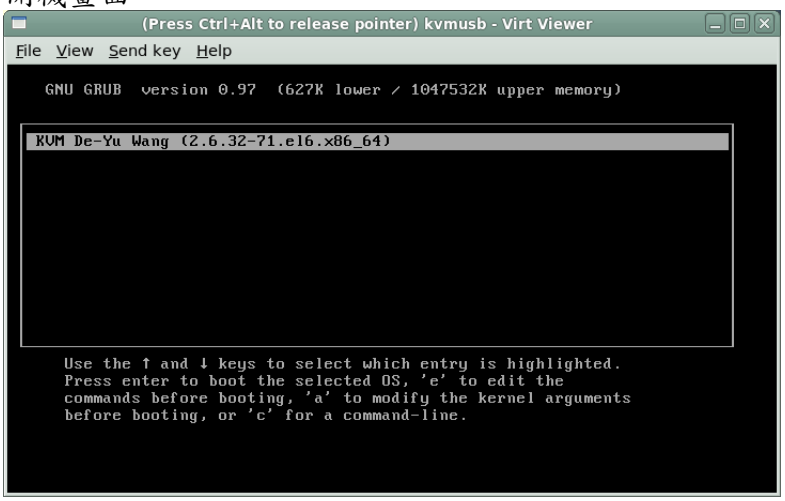
.............
[root@dyH tmp]# ll
total 163052
-rw-r--r--.  1 root root 118886400 Aug  1 09:06 install.img
drwxr-xr-x. 11 root root      4096 Aug 25  2012 squashfs-root
```

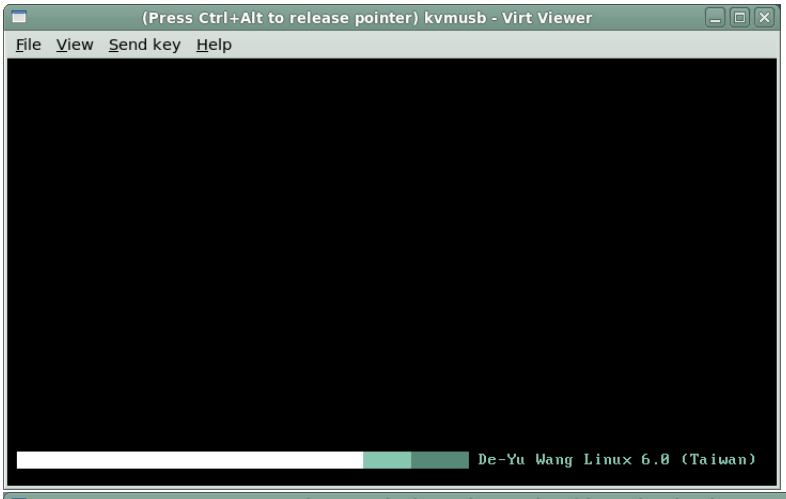
8.7 結果

1. 安裝畫面



2. 開機畫面




(Press Ctrl+Alt to release pointer) kvmusb - Virt Viewer
File View Send key Help
De-Yu Wang Linux 6.0 (Taiwan)


(Press Ctrl+Alt to release pointer) kvmusb - Virt Viewer
File View Send key Help
Applications Places System
Thu Aug 1, 11:50 root
Computer
root's Home
Trash
De-Yu Wang 6
20120820

Chapter 9

系統移機

9.1 前言

1. 如果要將磁碟 (硬碟、隨身碟、SD) 的系統完整移到其他磁碟，可以使用 dd 工具將整個磁碟複製到其他磁碟。

2. 當目的磁碟比目前系統的磁碟小，或者想要使用不同的分割方式，則 dd 工具就無法滿足需求。

3. 使用 dd 複製整個磁碟通常要花很長時間。

9.2 備份系統

1. 要備份的隨身碟編號是 sdc，sdc1 及 vg_crt-root, vg_crt-home 兩個 lv，共三個檔案系統必須備份。

```
[root@dywmac ~]# vgscan
  Reading all physical volumes.  This may take a while...
  Found volume group "vg_crt" using metadata type lvm2
  Found volume group "dywmac" using metadata type lvm2
[root@dywmac ~]# vgchange -ay
  3 logical volume(s) in volume group "vg_crt" now active
  4 logical volume(s) in volume group "dywmac" now active
[root@dywmac ~]# lsblk /dev/sdc
NAME                  MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
sdc                     8:32   1 29.5G  0 disk
  sdc1                  8:33   1  128M  0 part /media/crt-boot
  sdc2                  8:34   1 13.7G  0 part
    vg_crt-root (dm-4) 253:4    0 12.7G  0 lvm
    vg_crt-home (dm-5) 253:5    0  256M  0 lvm
    vg_crt-swap (dm-6) 253:6    0  256M  0 lvm
```

2. 隨身碟中三個檔案系統的所有資料要備份起來，先掛載這三個檔案系統。

```
[root@dywmac ~]# mount /dev/mapper/vg_crt-root /mnt/root/
[root@dywmac ~]# mount /dev/mapper/vg_crt-home /mnt/home/
[root@dywmac ~]# lsblk /dev/sdc
NAME                   MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
sdc                      8:32   1 29.5G  0 disk
  sdc1                   8:33   1  128M  0 part /media/crt-boot
  sdc2                   8:34   1 13.7G  0 part
    vg_crt-root (dm-4) 253:4    0 12.7G  0 lvm  /mnt/root
    vg_crt-home (dm-5) 253:5    0  256M  0 lvm  /mnt/home
    vg_crt-swap (dm-6) 253:6    0  256M  0 lvm
```

3. 如果是開機中的系統，則 rsync 命令要加 -x 參數指定單一檔案系統，這樣才不會把其目錄下的其他檔案系統及記憶體內的資料也複製進來。

```
[root@dywmac ~]# mkdir /usr/src/tmp{1,2,3}
[root@dywmac ~]# rsync -ax /media/crt-boot/* /usr/src/tmp1/
[root@dywmac ~]# rsync -ax /mnt/root/* /usr/src/tmp2/
[root@dywmac ~]# rsync -ax /mnt/home/* /usr/src/tmp3/
```

4. 卸載 USB 隨身碟。

```
[root@dywmac ~]# umount /media/* /mnt/*
[root@dywmac ~]# dmsetup remove vg_crt-{root,home,swap}
```

9.3 複製檔案

1. 如果最後整顆隨身碟要用 dd 備份並進行壓縮，強烈建議先將隨身碟內的資料都清除，這樣壓縮效果會比較好。

```
[root@dywmac ~]# dd if=/dev/zero of=/dev/sdc1 bs=4M count=4000; sync
```

2. 分割隨身碟，大小不見得要跟原隨身碟中的系統一樣。

```
[root@dywmac ~]# fdisk -luc /dev/sdc

Disk /dev/sdc: 15.4 GB, 15374744064 bytes
64 heads, 32 sectors/track, 14662 cylinders, total 30028797 sectors
Units = sectors of 1 * 512 = 512 bytes
```

```
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x0006315d

   Device Boot      Start         End      Blocks   Id  System
/dev/sdc1   *        2048      411647      204800   83  Linux
/dev/sdc2          411648    27674623    13631488   8e  Linux LVM
```

3. 建立 lvm 檔案系統及格式化，大小不見得要與原隨身碟一樣，但 vg 及 lv 的名字如果不一樣，複製檔案還要改很多，比較麻煩。

```
[root@dywmac ~]# pvcreate /dev/sdc2
[root@dywmac ~]# vgcreate vg_crt /dev/sdc2
[root@dywmac ~]# lvcreate -L 12G -n root vg_crt
[root@dywmac ~]# lvcreate -L 200M -n home vg_crt
[root@dywmac ~]# lvcreate -L 500M -n swap vg_crt
[root@dywmac ~]# mkfs.ext4 /dev/sdc1
[root@dywmac ~]# mkfs.ext4 /dev/mapper/vg_crt-home
[root@dywmac ~]# mkfs.ext4 /dev/mapper/vg_crt-root
[root@dywmac ~]# mkswap /dev/mapper/vg_crt-swap
```

4. 掛載並複製檔案到新的隨身碟。

```
[root@dywmac ~]# mount /dev/sdc1 /mnt/boot/
[root@dywmac ~]# mount /dev/mapper/vg_crt-root /mnt/root/
[root@dywmac ~]# mount /dev/mapper/vg_crt-home /mnt/home/
[root@dywmac ~]# rsync -ax /usr/src/tmp1/* /mnt/boot/
[root@dywmac ~]# rsync -ax /usr/src/tmp2/* /mnt/root/
[root@dywmac ~]# rsync -ax /usr/src/tmp3/* /mnt/home/
[root@dywmac ~]# sync
```

9.4 新系統調整

1. 掛載新的隨身碟，根目錄在 /mnt/root。

```
[root@dywmac ~]# mount /dev/mapper/vg_crt-root /mnt/root/
[root@dywmac ~]# mount /dev/mapper/vg_crt-home /mnt/root/home/
[root@dywmac ~]# mount /dev/sdc1 /mnt/root/boot/
```

2. 光是將檔案複製到新的隨身碟，通常是無法開機，至少必須先將 grub 安裝到新的隨身碟，重新產生 device.map 才能開機。

```
[root@dywmac ~]# grub-install --recheck --root-directory=/mnt/root/ /dev
    /sdc
Probing devices to guess BIOS drives. This may take a long time.
Installation finished. No error reported.
This is the contents of the device map /mnt/boot//boot/grub/device.map.
Check if this is correct or not. If any of the lines is incorrect,
fix it and re-run the script `grub-install'.

(fd0)   /dev/fd0
(hd0)   /dev/sda
(hd1)   /dev/sdc
```

3. 由於各分割區都是新建立的，UUID 不可能相同，掛載表中使用 UUID 掛載的都要修改，例如查詢新隨身碟 /dev/sdc1 分割區的 UUID，並修改 fstab 掛載表使其一致，否則開機時無法掛載。

```
[root@dywmac ~]# blkid /dev/sdc1
/dev/sdc1: UUID="d98d1c88-504d-4dc4-9eb5-d557e3f28cfe" TYPE="ext4"
[root@dywmac ~]# vim /mnt/root/etc/fstab
[root@dywmac ~]# grep boot /mnt/root/etc/fstab
UUID=d98d1c88-504d-4dc4-9eb5-d557e3f28cfe /boot ext4  defaults   1 2
```

4. 在新系統的根目錄產生隱藏檔.autorelabel，否則開機後因 selinux 管制而無法登。

```
[root@dywmac ~]# touch /mnt/root/.autorelabel
```

5. 卸載隨身碟，取出隨身碟到其他電腦開機。

```
[root@dywmac ~]# umount /mnt/*
```

9.5 新系統開機

1. 新製作好的隨身碟開機，如果無法順利完成整個開機過程，至少會出現 grub-shell，如同 grub.conf 的設定，指定正確的 root, kernel, initrd 應該可以開機。以下是 grub (非 grub 2)，這個 shell 一樣可以使用 TAB 來補齊或提示參數。

```
[ Minimal BASH-like line editing is supported. For the first word, TAB
  lists possible command completions. Anywhere else TAB lists the
     possible
  completions of a device/filename. ]
grub>
```

2. root 指定核心所在位置 (hd0,0)，成功會出現檔案系統訊息。

```
grub> root (hd0,0)
 Filesystem type is ext2fs, partition type 0x83
```

3. 指定核心及根目錄掛載點，最後一定要加上參數 selinux=0 關閉 SELinux，否則會開機後會無法登入。

```
grub> kernel /vmlinuz-2.6.32-573.el6.x86_64 root=/dev/mapper/vg_crt-root
     selinux=0
 [Linux-bzImage, setup=0x3c00, size=0x5de280]
```

4. 指定 initrd 檔。

```
grub> initrd /initramfs-4.8.1-1.el6.elrepo.x86_64.img
 [Linux-initrd @ 0x361f1000, 0x1dfe1b5 bytes]
```

5. 開機。

```
grub> boot
```

6. 開機後檢查目前隨身碟編號 sdc，重新安裝 grub 至 sdc，出現錯誤。

```
[root@deyu ~]# df -h
Filesystem            Size  Used Avail Use% Mounted on
/dev/mapper/vg_crt-root
                       12G  6.5G  4.7G  59% /
tmpfs                 3.9G   80K  3.9G   1% /dev/shm
/dev/sdc1             190M   72M  105M  41% /boot
/dev/mapper/vg_crt-home
                      190M   23M  153M  13% /home

[root@deyu ~]# grub-install /dev/sdc
/dev/sdc does not have any corresponding BIOS drive.
```

7. 必須以 --recheck 選項重新安裝 grub 到 sdc。

```
[root@deyu ~]# grub-install --recheck /dev/sdc
Probing devices to guess BIOS drives. This may take a long time.
Installation finished. No error reported.
This is the contents of the device map /boot/grub/device.map.
Check if this is correct or not. If any of the lines is incorrect,
fix it and re-run the script `grub-install'.

(fd0)   /dev/fd0
(hd0)   /dev/sda
(hd1)   /dev/sdb
(hd2)   /dev/sdc
```

8. 重新開機，SELinux targeted policy relabel 所以要發點時間。

```
[root@deyu ~]# reboot
```

9.6 Image dd 與壓縮

1. 下載壓縮的 image 檔，直接寫入隨身碟。

```
# wget http://ip/crt.img -O - | xzcat | dd of=/dev/sdc bs=4M
# wget http://ip/crt.img -O - | xcat | dd of=/dev/sdc bs=4M
```

2. 隨身碟備份成檔案並壓縮。

```
# dd if=/dev/sdc conv=sync,noerror bs=100M count=150| gzip -c  > /usr/
    src/crt.img.gz
# dd if=/dev/sdc conv=sync,noerror bs=100M count=150| xz -c  > /usr/src/
    crt.img.xz
```

3. 解壓縮 image 檔，直接寫入隨身碟。

```
# gunzip -c /usr/src/crt.img.gz | dd of=/dev/sdc conv=sync,noerror bs=64
    K
```

9.7 Image 掛載與編輯

1. 查看 image 檔。

```
[root@dywmac ~]# cd /usr/src
[root@dywmac src]# file crt15g.img
crt15g.img: x86 boot sector; GRand Unified Bootloader, stage1 version 0
    x3, boot drive 0x80, 1st sector stage2 0x6298, GRUB version 0.94;
    partition 1: ID=0x83, active, starthead 32, startsector 2048, 262144
     sectors; partition 2: ID=0x8e, starthead 113, startsector 264192,
    28672000 sectors, code offset 0x48
```

2. 無法直接掛載 image 檔。

```
[root@dywmac src]# mount crt15g.img /mnt/test
mount: you must specify the filesystem type
```

3. 查看 image 檔，包含兩個檔案系統，第一個檔案系統從 sector 2048 開始。

```
[root@dywmac src]# fdisk -luc crt15g.img
You must set cylinders.
You can do this from the extra functions menu.

Disk crt15g.img: 0 MB, 0 bytes
255 heads, 63 sectors/track, 0 cylinders, total 0 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x0006315d

     Device Boot      Start         End      Blocks   Id  System
crt15g.img1   *        2048      264191      131072   83  Linux
```

4. 必須位移 2048 個 sectors，每個 sector 512 bytes，以 loop 及 offset 位移 1048576 (2048x512) 參數掛掛載 image 檔。

```
[root@dywmac src]# mount -o rw,loop,offset=1048576 crt15g.img /mnt/loop/
[root@dywmac src]# mount | grep crt15
/usr/src/crt15g.img on /mnt/loop type ext4 (rw,loop=/dev/loop0,offset
    =1048576)
[root@dywmac src]# ls /mnt/loop/
config-2.6.32-573.el6.x86_64              symvers-2.6.32-573.el6.x86_64.
    gz
config-4.8.1-1.el6.elrepo.x86_64          symvers-4.8.1-1.el6.elrepo.
    x86_64.gz
```

```
7  efi                                         System.map-2.6.32-573.el6.
       x86_64
   grub                                        System.map-4.8.1-1.el6.elrepo.
       x86_64
9  initramfs-2.6.32-573.el6.x86_64.img         vmlinuz-2.6.32-573.el6.x86_64
   initramfs-4.8.1-1.el6.elrepo.x86_64.img     vmlinuz-4.8.1-1.el6.elrepo.
       x86_64
11 lost+found
```

5. 掛載 image 檔的第二個檔案系統，第二個檔案系統從 sector 264192 開始 (264192x512=135266304)。不能直接掛載 LVM 檔案系統，要使用 losetup 命令設定 loop 裝置。

```
1  [root@dywmac src]# mount -o rw,loop,offset=135266304 crt15g.img /mnt/
       loop/
   mount: unknown filesystem type 'LVM2_member'
3  [root@dywmac src]# losetup --offset 135266304 /dev/loop1 crt15g.img
```

6. image 檔的第二個檔案系統是 LVM 格式，無法直接掛載。

```
1  [root@dywmac src]# mount /dev/loop1 /mnt/loop1
   mount: unknown filesystem type 'LVM2_member'
```

7. losetup 設定 image 檔的第二個檔案系統爲 loop device 後，vgscan 掃描 vg，出現 vg_crt。

```
   [root@dywmac src]# vgscan
2    Reading all physical volumes.  This may take a while...
     Found volume group "dywmac" using metadata type lvm2
4    Found volume group "vg_crt" using metadata type lvm2
```

8. 啓動 vg_crt vg。

```
   [root@dywmac ~]# vgchange -ay vg_crt
2    3 logical volume(s) in volume group "vg_crt" now active
```

9. 掛載 lv vg_crt-root。

```
[root@dywmac ~]# mount /dev/mapper/vg_crt-root /mnt/root/
```

10. 卸載 lv vg_crt-root。

```
[root@dywmac ~]# umount /mnt/root/
```

11. 移除 lv vg_crt-root, vg_crt-home, vg_crt-swap mapping。

```
[root@dywmac ~]# dmsetup remove vg_crt-{root,home,swap}
```

12. 卸載 lv loop1 裝置。

```
[root@dywmac ~]# losetup -d /dev/loop1
```

9.8 zerofree 降低 Image 壓縮檔安大小

1. 虛擬機工作一段時間，檔案系統中總會有已刪除的檔案，而 Linux ext 檔案系統刪除檔案僅刪除 inode，儲存檔案內容的 block 並沒清空。因此，壓縮虛擬機 image 檔時會越來越大，爲解決此一問題可以使用 zerofree 清空已刪除檔案的內容。編譯 zerofree 必須先安裝 e2fsprogs-devel 開發套件。

```
[root@dyw219 ~]# yum install e2fsprogs-devel --enablerepo=centos
```

2. 下載 zerofree 程式原碼。

```
[root@dyw219 ~]# cd /usr/src
[root@dyw219 src]# wget http://frippery.org/uml/zerofree-1.0.3.tgz
```

3. 解打包壓縮 zerofree 程式原碼。

```
[root@dyw219 src]# tar zxvf zerofree-1.0.3.tgz
```

4. 進入 zerofree-1.0.3 目錄，執行 make 進行編譯。

```
[root@dyw219 src]# cd zerofree-1.0.3
[root@dyw219 zerofree-1.0.3]# make
```

5. 查看 zerofree-1.0.3 目錄已產生 zerofree 可執行檔。

```
[root@dyw219 zerofree-1.0.3]# ll
total 40
-rw-r--r--. 1 1000 1000 17921 Aug 12  2007 COPYING
-rw-rw-r--. 1 1000 1000   109 Aug 10  2012 Makefile
-rwxr-xr-x. 1 root root 11177 Dec  7 18:02 zerofree
-rw-rw-r--. 1 1000 1000  3870 Aug 10  2012 zerofree.c
```

6. 本例虛擬機已開機，IP 是 192.168.122.100。將 zerofree 可執行檔複製到虛擬機的 /usr/bin 目錄。

```
[root@dyw219 zerofree-1.0.3]# scp zerofree 192.168.122.100:/usr/src
```

7. 虛擬機重開機，編輯開機選單，在核心參數中加上 ro init=/bin/bash 參數後開機，再以 zerofree 進行檔案系統的清除工作。

```
bash /# zerofree /dev/mapper/vg_crt-root
```

Chapter 10

RAW IMAGE LVM 掛載

10.1 前言

1. 無論虛擬機或隨身碟開機系統，平常都存成 image 檔。
2. 要修改系統不一定要使用 image 開機。
3. 可以直接將 image 檔掛載起來修改。

10.2 Image 掛載

1. 原始的 DYW 系統，USB 開機碟分割狀態。

```
[root@dyw219 ~]# fdisk -luc bin/crtefi15g-20181130.img
You must set cylinders.
You can do this from the extra functions menu.

Disk bin/crtefi15g-20181130.img: 0 MB, 0 bytes
64 heads, 32 sectors/track, 0 cylinders, total 0 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x55654248

                      Device Boot      Start         End      Blocks   Id
                           System
bin/crtefi15g-20181130.img1   *        2048      329727      163840   83
     Linux
bin/crtefi15g-20181130.img2          329728    29689855    14680064   8e
     Linux LVM
bin/crtefi15g-20181130.img3        29689856    29700095        5120   ef
     EFI (FAT-12/16/32)
```

2. 將第二個分割區掛載起來，其中 offset=168820736 是開始 sector 329728 乘以 512 bytes。因此分割區爲 LVM type，所以無法直接掛載。

```
[root@dyw219 ~]# mount -oloop,offset=168820736 bin/crtefi15g-20181130.
    img /mnt/efi
mount: unknown filesystem type 'LVM2_member'
```

10.3 啓用 Image 中的 LVM

1. 使用 kpartx 偵測啓用 image 中的 parttions。

```
[root@dyw219 ~]# kpartx -av bin/crtefi15g-20181130.img
add map loop0p1 (253:4): 0 327680 linear /dev/loop0 2048
add map loop0p2 (253:5): 0 29360128 linear /dev/loop0 329728
add map loop0p3 (253:6): 0 10240 linear /dev/loop0 29689856
```

2. vgscan 偵測所有的 VG。

```
[root@dyw219 ~]# vgscan
  Reading all physical volumes.  This may take a while...
  Found volume group "vg_crt" using metadata type lvm2
  Found volume group "vg_dyw219" using metadata type lvm2
```

3. vgchange 啓用所有的 VG。

```
[root@dyw219 ~]# vgchange -ay
  3 logical volume(s) in volume group "vg_crt" now active
  4 logical volume(s) in volume group "vg_dyw219" now active
```

4. 查看 /dev/loop0，其中第二個分割區 loop0p2 出現三個 LVM 管理的 LV。

```
[root@dyw219 ~]# lsblk /dev/loop0
NAME                  MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
loop0                   7:0    0 14.7G  0 loop
  loop0p1 (dm-4)      253:4    0  160M  0 part
  loop0p2 (dm-5)      253:5    0   14G  0 part
    vg_crt-home (dm-7) 253:7   0  160M  0 lvm
    vg_crt-swap (dm-8) 253:8   0  500M  0 lvm
    vg_crt-root (dm-9) 253:9   0   13G  0 lvm
  loop0p3 (dm-6)      253:6    0    5M  0 part
```

10.4 掛載要變更內容的 LV

1. 掛載 /dev/mapper/vg_crt-root 到 /mnt/root。

```
[root@dyw219 ~]# mount /dev/mapper/vg_crt-root /mnt/root/
```

2. 查看掛載目錄 /mnt/root 下的 /lib/firmware/ath10k 目錄，目前只有 QCA9377 次目錄。

```
[root@dyw219 ~]# ll /mnt/root/lib/firmware/ath10k/
total 4
drwxr-xr-x. 3 root root 4096 Nov 15 19:40 QCA9377
```

10.5 複製 ath10-firmware

1. git clone 下載 ath10k-firmare。

```
[root@dyw219 ~]# cd /usr/src/
[root@dyw219 src]# git clone https://github.com/kvalo/ath10k-firmware.
    git
```

2. 查看 git clone 的 ath10k-firmare 目錄。

```
[root@dyw219 src]# ll ath10k-firmware/
total 48
-rw-r--r--. 1 root root 2536 Jan  4 08:56 LICENSE.qca_firmware
-rw-r--r--. 1 root root   69 Jan  4 08:56 Makefile
drwxr-xr-x. 3 root root 4096 Jan  4 08:56 QCA4019
drwxr-xr-x. 4 root root 4096 Jan  4 08:56 QCA6174
drwxr-xr-x. 3 root root 4096 Jan  4 08:56 QCA9377
drwxr-xr-x. 3 root root 4096 Jan  4 08:56 QCA9887
drwxr-xr-x. 3 root root 4096 Jan  4 08:56 QCA9888
drwxr-xr-x. 3 root root 4096 Jan  4 08:56 QCA988X
drwxr-xr-x. 3 root root 4096 Jan  4 08:56 QCA9984
drwxr-xr-x. 3 root root 4096 Jan  4 08:56 QCA99X0
-rw-r--r--. 1 root root  390 Jan  4 08:56 README.md
drwxr-xr-x. 3 root root 4096 Jan  4 08:56 WCN3990
```

3. 複製 ath10k-firmware 目錄中的所有 drivers 到 /mnt/root/lib/firmware/ath10k 目錄。

```
[root@dyw219 src]# cp -a ath10k-firmware/{Q,W}* /mnt/root/lib/firmware/
    ath10k/
```

4. 如果需要 QCA9377/hw1.0 的 firmware-6.bin，必須將最新版本 WLAN.TF.2.1 目錄下的 firmware-6.bin_WLAN.TF.2.1-00021-QCARMSWP-1 複製或連結到 hw1.0 目錄下，且檔名改爲 firmware-6.bin。

```
[root@dyw219 ath10k]# cd QCA9377/hw1.0/
[root@dyw219 hw1.0]# ln WLAN.TF.2.1/\
firmware-6.bin_WLAN.TF.2.1-00021-QCARMSWP-1 firmware-6.bin
```

10.6 腳本完成連結

1. 進到工作目錄 /mnt/root/lib/firmware/ath10k。

```
[root@dyw219 ~]# cd /mnt/root/lib/firmware/ath10k
```

2. 撰寫一腳本 ln.sh，找到所有 firmware-*.bin.* 檔，且以最新版優先排列，取出目錄及檔名，判斷要做的 firmware-*.bin 連結檔是否存在？不存在則進行連結。

```
[root@dyw219 ath10k]# vim ln.sh
[root@dyw219 ath10k]# cat ln.sh
wdir=$(pwd)
for line in $(find QCA* -name firmware-[1-9].bin* | sort -r); do
    dir=$(echo $line | sed -r 's|(.*hw[1-3]\.[01])/.*|\1|')
    file=${line#$dir/}
    cd $dir
    file1=$(echo $file | grep -o firmware\-[1-9]\.bin)
    [ ! -e $file1 ] && ln $file $file1
    cd $wdir
done
exit 0
```

3. 執行腳本 ln.sh。

```
[root@dyw219 ath10k]# sh ln.sh
```

4. 查看所有 QCA*/hw* 目錄下都有 firmware-*.bin 檔案了。

```
[root@dyw219 ath10k]# ll QCA*/hw*/firmware*.bin
-rw-r--r--. 2 root root 583344 Jan  4 08:56 QCA4019/hw1.0/firmware-5.bin
-rw-r--r--. 2 root root 498172 Jan  4 08:56 QCA6174/hw2.1/firmware-5.bin
-rw-r--r--. 2 root root 733784 Jan  4 08:56 QCA6174/hw3.0/firmware-4.bin
-rw-r--r--. 1 root root 783336 Nov 15 19:41 QCA9377/hw1.0/firmware-5.bin
-rw-r--r--. 1 root root 751436 Nov 15 19:41 QCA9377/hw1.0/firmware-6.bin
-rw-r--r--. 2 root root 237660 Jan  4 08:56 QCA9887/hw1.0/firmware-5.bin
-rw-r--r--. 2 root root 675492 Jan  4 08:56 QCA9888/hw2.0/firmware-5.bin
-rw-r--r--. 2 root root 254564 Jan  4 08:56 QCA988X/hw2.0/firmware-2.bin
-rw-r--r--. 2 root root 674748 Jan  4 08:56 QCA9984/hw1.0/firmware-5.bin
-rw-r--r--. 2 root root 479332 Jan  4 08:56 QCA99X0/hw2.0/firmware-5.bin
```

10.7 卸除 Image

1. 卸載 /mnt/root。

```
[root@dyw219 ~]# umount /mnt/root/
```

2. zerofree 整理 /dev/vg_crt/root，可以讓 image 壓縮時得到較好的結果。

```
[root@dyw219 ~]# zerofree /dev/vg_crt/root
```

3. dmsetup remove 移除 image 中所有 LVM mapping。vgs 查看 VG，已不見 vg_crt。lsblk 查看 /dev/loop0，也不見 /dev/loop0 下的 loop0p2 分割區中的 mapping。

```
[root@dyw219 ~]# dmsetup remove /dev/vg_crt/*
[root@dyw219 ~]# vgs
  VG        #PV #LV #SN Attr   VSize   VFree
  vg_dyw219   1   4   0 wz--n- 465.27g 10.55g
[root@dyw219 ~]# lsblk /dev/loop0
NAME                  MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
loop0                   7:0    0 14.7G  0 loop
  loop0p1 (dm-4)      253:4    0  160M  0 part
  loop0p2 (dm-5)      253:5    0   14G  0 part
  loop0p3 (dm-6)      253:6    0    5M  0 part
```

4. kpartx -d 移除 image 中所有 partitions。lsblk 查看 /dev/loop0 已不見其分割區 loop0p1, loop0p2, loop0p3。

```
[root@dyw219 ~]# kpartx -d /dev/loop0
[root@dyw219 ~]# lsblk /dev/loop0
NAME                  MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
loop0                   7:0    0 14.7G  0 loop
```

5. losetup -d 移除 image device /dev/loop0。再用 lsblk 查看 /dev/loop0 已不見任何 device。

```
[root@dyw219 ~]# losetup -d /dev/loop0
[root@dyw219 ~]# lsblk /dev/loop0
```

Chapter 11

RAW IMAGE 重新分割

11.1 前言

1. 使用 kpartx 偵測啓用 image 中的 parttions。

```
[root@dyw219 ~]# kpartx -av bin/crtefi15g-20181130.img
add map loop0p1 (253:4): 0 327680 linear /dev/loop0 2048
add map loop0p2 (253:5): 0 29360128 linear /dev/loop0 329728
add map loop0p3 (253:6): 0 10240 linear /dev/loop0 29689856
```

2. crtefi15g-20190112.img 分割區 3 是 UEFI 開機分割區，當使用的 USB 隨身碟大小比 image 小一點點，複製時會造成 UEFI 無法開機，本節是將此分割區移到最前頭的第一個分割區。

```
[root@controller src]# fdisk -l crtefi15g-20190112.img

Disk crtefi15g-20190112.img: 15.7 GB, 15728640000 bytes, 30720000
    sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
Disk identifier: 0x55654248

                  Device Boot      Start         End      Blocks   Id
                      System
crtefi15g-20190112.img1   *        2048      329727      163840   83
    Linux
crtefi15g-20190112.img2          329728    29689855    14680064   8e
    Linux LVM
crtefi15g-20190112.img3        29689856    29700095        5120   ef
    EFI (FAT-12/16/32)
```

11.2 重新分割前先備份

1. 建立掛載目錄，將 crtefi15g-20190112.img 的第一個分割區掛載在 /mnt/boot，第三個分割區掛載在 /mnt/efi。

```
[root@controller src]# mkdir /mnt/{efi,root,boot}
[root@controller src]# mount -oloop,offset=1048576 crtefi15g-20190112.
    img /mnt/boot
[root@controller src]# mount -oloop,offset=15201206272 crtefi15g
    -20190112.img /mnt/efi/
```

2. 查看掛載狀況。

```
[root@controller src]# df -h
Filesystem               Size  Used Avail Use% Mounted on
/dev/mapper/centos-root  200G  112G   89G  56% /
devtmpfs                  20G     0   20G   0% /dev
tmpfs                     20G     0   20G   0% /dev/shm
tmpfs                     20G  179M   20G   1% /run
tmpfs                     20G     0   20G   0% /sys/fs/cgroup
/dev/sda1                497M  196M  302M  40% /boot
/dev/mapper/centos-var   300G  169G  132G  57% /var
/dev/mapper/centos-home  200G   48G  153G  24% /home
tmpfs                    4.0G     0  4.0G   0% /run/user/0
/dev/loop1               151M  116M   25M  83% /mnt/boot
/dev/loop2               5.0M  258K  4.8M   6% /mnt/efi
```

3. 建立 crtefi 目錄，將 /mnt/boot 及 /mnt/efi 的資料備份到此目錄。

```
[root@controller src]# mkdir crtefi
[root@controller src]# cp -a /mnt/efi/
EFI/                       System Volume Information/
[root@controller src]# cp -a /mnt/efi crtefi/
[root@controller src]# cp -a /mnt/boot crtefi/
```

11.3 備份後卸載

1. 卸載 /mnt/boot 及 /mnt/efi。

```
[root@controller src]# umount /mnt/boot/
[root@controller src]# umount /mnt/efi/
```

2. 目前 crtefi15g-20190112.img 第二個分割區的 LVM 有啓用。

```
[root@controller src]# lsblk /dev/loop0
NAME            MAJ:MIN RM   SIZE RO TYPE MOUNTPOINT
loop0             7:0    0  14.7G  0 loop
  loop0p1       253:4    0   160M  0 part
  loop0p2       253:5    0    14G  0 part
    vg_crt-home 253:7    0   160M  0 lvm
    vg_crt-swap 253:8    0   500M  0 lvm
    vg_crt-root 253:9    0    13G  0 lvm
  loop0p3       253:6    0     5M  0 part
```

3. 必須關閉啓用的 crtefi15g-20190112.img 第二個分割區的 LVM mapping。

```
[root@controller src]# dmsetup remove /dev/vg_crt/*
```

4. crtefi15g-20190112.img 第二個分割區的 LVM mapping 已關閉。

```
[root@controller src]# lsblk /dev/loop0
NAME            MAJ:MIN RM   SIZE RO TYPE MOUNTPOINT
loop0             7:0    0  14.7G  0 loop
  loop0p1       253:4    0   160M  0 part
  loop0p2       253:5    0    14G  0 part
  loop0p3       253:6    0     5M  0 part
```

11.4 開始重新分割

1. fdisk 重新分割 crtefi15g-20190112.img。

```
[root@controller src]# fdisk crtefi15g-20190112.img
Welcome to fdisk (util-linux 2.23.2).

Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.


Command (m for help): p

Disk crtefi15g-20190112.img: 15.7 GB, 15728640000 bytes, 30720000
    sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
```

```
Disk identifier: 0x55654248

                Device Boot      Start         End      Blocks   Id
                   System
crtefi15g-20190112.img1   *        2048      329727      163840   83
   Linux
crtefi15g-20190112.img2          329728    29689855    14680064   8e
   Linux LVM
crtefi15g-20190112.img3        29689856    29700095        5120   ef
   EFI (FAT-12/16/32)
```

2. 刪除第一分割區。

```
Command (m for help): d
Partition number (1-3, default 3): 1
Partition 1 is deleted

Command (m for help): p

Disk crtefi15g-20190112.img: 15.7 GB, 15728640000 bytes, 30720000
   sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
Disk identifier: 0x55654248

                Device Boot      Start         End      Blocks   Id
                   System
crtefi15g-20190112.img2          329728    29689855    14680064   8e
   Linux LVM
crtefi15g-20190112.img3        29689856    29700095        5120   ef
   EFI (FAT-12/16/32)
```

3. 建立新的分割區 2M ，type 是 EFI。

```
Command (m for help): n
Partition type:
   p   primary (2 primary, 0 extended, 2 free)
   e   extended
Select (default p): p
Partition number (1,4, default 1):
First sector (2048-30719999, default 2048):
Using default value 2048
Last sector, +sectors or +size{K,M,G} (2048-329727, default 329727): +2M
Partition 1 of type Linux and of size 2 MiB is set

Command (m for help): t
Partition number (1-3, default 3): 1
```

```
Hex code (type L to list all codes): ef
Changed type of partition 'Linux' to 'EFI (FAT-12/16/32)'

Command (m for help): p

Disk crtefi15g-20190112.img: 15.7 GB, 15728640000 bytes, 30720000
    sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
Disk identifier: 0x55654248

                 Device Boot      Start         End      Blocks   Id
                    System
crtefi15g-20190112.img1            2048        6143        2048   ef
    EFI (FAT-12/16/32)
crtefi15g-20190112.img2          329728    29689855    14680064   8e
    Linux LVM
crtefi15g-20190112.img3        29689856    29700095        5120   ef
    EFI (FAT-12/16/32)
```

4. 刪除第三個分割區。

```
Command (m for help): d
Partition number (1-3, default 3):
Partition 3 is deleted
```

5. 新增第三個分割區。

```
Command (m for help): n
Partition type:
   p   primary (2 primary, 0 extended, 2 free)
   e   extended
Select (default p):
Using default response p
Partition number (3,4, default 3):
First sector (6144-30719999, default 6144):
Using default value 6144
Last sector, +sectors or +size{K,M,G} (6144-329727, default 329727):
Using default value 329727
Partition 3 of type Linux and of size 158 MiB is set

Command (m for help): p

Disk crtefi15g-20190112.img: 15.7 GB, 15728640000 bytes, 30720000
    sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
```

```
19 I/O size (minimum/optimal): 512 bytes / 512 bytes
   Disk label type: dos
21 Disk identifier: 0x55654248

23                 Device Boot      Start         End      Blocks   Id
                      System
   crtefi15g-20190112.img1            2048        6143        2048   ef
      EFI (FAT-12/16/32)
25 crtefi15g-20190112.img2          329728    29689855    14680064   8e
      Linux LVM
   crtefi15g-20190112.img3            6144      329727      161792   83
      Linux
```

6. 新增的第三個分割區，位置是在第二個分割區，但編號是 3，所以要重新排序，x 命令進入專家命令。

```
2 Partition table entries are not in disk order

  Command (m for help): x
```

7. f 命令調整編號。

```
1 Expert command (m for help): f
  Done.
```

8. r 退出專家命令模式。

```
Expert command (m for help): r
```

9. p 查看分割區，已重新排序。

```
1 Command (m for help): p

3 Disk crtefi15g-20190112.img: 15.7 GB, 15728640000 bytes, 30720000
     sectors
  Units = sectors of 1 * 512 = 512 bytes
5 Sector size (logical/physical): 512 bytes / 512 bytes
  I/O size (minimum/optimal): 512 bytes / 512 bytes
7 Disk label type: dos
  Disk identifier: 0x55654248
9
                   Device Boot      Start         End      Blocks   Id
                      System
```

```
11 crtefi15g-20190112.img1            2048        6143        2048   ef
       EFI (FAT-12/16/32)
   crtefi15g-20190112.img2            6144      329727      161792   83
       Linux
13 crtefi15g-20190112.img3          329728    29689855    14680064   8e
       Linux LVM
```

10. 設定第二個分割區爲 Linux 開機分割區。

```
1  Command (m for help): a
   Partition number (1-3, default 3): 2
3
   Command (m for help): p
5
   Disk crtefi15g-20190112.img: 15.7 GB, 15728640000 bytes, 30720000
       sectors
7  Units = sectors of 1 * 512 = 512 bytes
   Sector size (logical/physical): 512 bytes / 512 bytes
9  I/O size (minimum/optimal): 512 bytes / 512 bytes
   Disk label type: dos
11 Disk identifier: 0x55654248

13                 Device Boot      Start         End      Blocks   Id
                       System
   crtefi15g-20190112.img1            2048        6143        2048   ef
       EFI (FAT-12/16/32)
15 crtefi15g-20190112.img2   *        6144      329727      161792   83
       Linux
   crtefi15g-20190112.img3          329728    29689855    14680064   8e
       Linux LVM
```

11. 寫入分割表並退出。

```
   Command (m for help): w
2  The partition table has been altered!

4  Syncing disks.
```

11.5 格式化分割區

1. 先卸除 /dev/loop0。

```
   [root@controller src]# kpartx -d /dev/loop0
2  [root@controller src]# losetup -d /dev/loop0
```

```
[root@controller src]# lsblk /dev/loop0
```

2. 使用 losetup 將 crtefi15g-2019-112.img 設爲 loopback device。

```
[root@controller src]# losetup /dev/loop0 crtefi15g-20190112.img
[root@controller src]# lsblk /dev/loop0
NAME      MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
loop0       7:0    0 14.7G  0 loop
  loop0p1 259:0    0    2M  0 loop
  loop0p2 259:1    0  158M  0 loop
  loop0p3 259:2    0   14G  0 loop
```

3. 將 crtefi15g-2019-112.img 的第一個分割區格式化爲 fat。

```
[root@controller src]# mkfs.fat /dev/loop0p1
mkfs.fat 3.0.20 (12 Jun 2013)
unable to get drive geometry, using default 255/63
```

4. 將 crtefi15g-2019-112.img 的第二個分割區格式化爲 ext3。

```
[root@controller src]# mkfs.ext3 /dev/loop0p2
mke2fs 1.42.9 (28-Dec-2013)
Discarding device blocks: done
Filesystem label=
OS type: Linux
Block size=1024 (log=0)
Fragment size=1024 (log=0)
Stride=0 blocks, Stripe width=0 blocks
40480 inodes, 161792 blocks
8089 blocks (5.00%) reserved for the super user
First data block=1
Maximum filesystem blocks=67371008
20 block groups
8192 blocks per group, 8192 fragments per group
2024 inodes per group
Superblock backups stored on blocks:
    8193, 24577, 40961, 57345, 73729

Allocating group tables: done
Writing inode tables: done
Creating journal (4096 blocks): done
Writing superblocks and filesystem accounting information: done
```

11.6 復原檔案

1. losetup 卸除 /dev/loop0。

```
[root@controller src]# losetup -d /dev/loop0
```

2. 先查看第一及第二個分割的 start section，分別是 2048 及 6144。

```
[root@controller src]# fdisk -l crtefi15g-20190112.img

Disk crtefi15g-20190112.img: 15.7 GB, 15728640000 bytes, 30720000
    sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
Disk identifier: 0x55654248

                Device Boot      Start         End      Blocks   Id
                   System
crtefi15g-20190112.img1            2048        6143        2048   ef
    EFI (FAT-12/16/32)
crtefi15g-20190112.img2   *        6144      329727      161792   83
    Linux
crtefi15g-20190112.img3          329728    29689855    14680064   8e
    Linux LVM
```

3. 將第一個分割區掛載在 /mnt/efi，第二個分割區掛載在 /mnt/boot，其中 offset=1048576 及 3145728 分別是 2048 及 6144 乘以 512 bytes。

```
[root@controller src]# mount -oloop,offset=1048576 crtefi15g-20190112.
    img /mnt/efi
[root@controller src]# mount -oloop,offset=3145728 crtefi15g-20190112.
    img /mnt/boot
[root@controller src]# df -h /mnt/*
Filesystem               Size  Used Avail Use% Mounted on
/dev/loop2               150M  1.6M  140M   2% /mnt/boot
/dev/loop1               2.0M     0  2.0M   0% /mnt/efi
```

4. 將原先備份的資料複製回去。

```
[root@controller src]# cp -a crtefi/efi/* /mnt/efi/
[root@controller src]# cp -a crtefi/boot/* /mnt/boot/
[root@controller src]# df -h /mnt/{efi,boot}
Filesystem      Size  Used Avail Use% Mounted on
```

```
/dev/loop1      2.0M  264K  1.8M  14% /mnt/efi
/dev/loop2      150M  117M   26M  83% /mnt/boot
```

5. 卸載。

```
[root@controller src]# umount /mnt/{efi,boot}
```

11.7 修改開機掛載

1. 因爲開機分割區已重新製作，其 UUID 必須不同，所以必須將系統的根目錄掛載分割區掛載起來，修改開機掛載表 /etc/fstab。因爲根目錄掛載是 LVM 管理的 LV，所以先使用 kpartx 啓用 crtefi15g-20190112.img 的 LVM 分割區。

```
[root@controller src]# kpartx -av crtefi15g-20190112.img
add map loop0p1 (253:4): 0 4096 linear /dev/loop0 2048
add map loop0p2 (253:5): 0 323584 linear /dev/loop0 6144
add map loop0p3 (253:6): 0 29360128 linear /dev/loop0 329728
```

2. 掃描 VG。

```
[root@controller src]# vgscan
  Reading volume groups from cache.
  Found volume group "vg_crt" using metadata type lvm2
  Found volume group "centos" using metadata type lvm2
```

3. 啓用 VG。

```
[root@controller src]# vgchange -ay
  3 logical volume(s) in volume group "vg_crt" now active
  4 logical volume(s) in volume group "centos" now active
```

4. 查看結果。

```
[root@controller src]# lsblk  /dev/loop0
loop0             7:0    0  14.7G  0 loop
  loop0p1       259:0    0     2M  0 loop
  loop0p2       259:1    0   158M  0 loop
  loop0p3       259:2    0    14G  0 loop
```

```
  loop0p1       253:4    0     2M  0 part
  loop0p2       253:5    0   158M  0 part
  loop0p3       253:6    0    14G  0 part
    vg_crt-home 253:7    0   160M  0 lvm
    vg_crt-swap 253:8    0   500M  0 lvm
    vg_crt-root 253:9    0    13G  0 lvm
```

5. 掛載 image 系統的根目錄掛載 LV 到 /mnt/root 目錄。

```
[root@controller src]# mount /dev/mapper/vg_crt-root /mnt/root/
```

6. 查看 image 開機分割區 /dev/loop0p2 的 UUID。

```
[root@controller src]# blkid /dev/loop0p2
/dev/loop0p2: UUID="528931f1-91bc-4919-94e8-13c39b1dfe71" SEC_TYPE="ext2
    " TYPE="ext3"
```

7. 編輯 image 系統的開機掛載表 /mnt/root/etc/fstab，將掛載點 /boot 的掛載裝置之 UUID 改成查到 /dev/loop0p2 的 UUID。

```
[root@controller src]# vim /mnt/root/etc/fstab
[root@controller src]# grep boot /mnt/root/etc/fstab
UUID=528931f1-91bc-4919-94e8-13c39b1dfe71 /boot   ext4    defaults
          1 2
```

11.8 修改 GRUB 開機選單

1. 由於 EFI 分割區在第一分割區，Linux 開機分割區由第一分割區 (hd0,0) 改到第二個分割區 (hd0,1)，所以 GRUB 開機選單必須修改，否則無法開機。先進入工作目錄 /usr/src/ 查 image 的分割區。

```
[root@controller ~]# cd /usr/src/
[root@controller src]# fdisk -l crtefi15g-20190112.img

Disk crtefi15g-20190112.img: 15.7 GB, 15728640000 bytes, 30720000
    sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
```

```
9  Disk identifier: 0x55654248
11                 Device Boot      Start         End      Blocks   Id
                      System
   crtefi15g-20190112.img1            2048        6143        2048   ef
      EFI (FAT-12/16/32)
13 crtefi15g-20190112.img2   *        6144      329727      161792   83
      Linux
   crtefi15g-20190112.img3          329728    29689855    14680064   8e
      Linux LVM
```

2. 分別掛載 image 的第一及二分割區在 /mnt/efi 及 /mnt/boot。

```
[root@controller src]# mount -oloop,offset=1048576 crtefi15g-20190112.
   img /mnt/efi
2  [root@controller src]# mount -oloop,offset=3145728 crtefi15g-20190112.
   img /mnt/boot
```

3. 將 efi 及 boot 中開機選單的 hd0,0 改成 hd0,1。

```
[root@controller src]# sed -i 's/hd0,0/hd0,1/g' /mnt/efi/EFI/BOOT/
   BOOTX64.conf
2  [root@controller src]# sed -i 's/hd0,0/hd0,1/g' /mnt/boot/grub/grub.conf
```

4. 卸載 /mnt/efi 及 /mnt/boot。

```
[root@controller src]# umount /mnt/{efi,boot}
```

11.9 卸除 Image

1. 卸載。

```
1  [root@controller src]# umount /mnt/root/
```

2. dmsetup remove 移除 image 中所有 LVM mapping。

```
1  [root@controller src]# dmsetup remove /dev/mapper/vg_crt-*
```

3. kaprtx -d 移除 image 中的所有 partitions。lsblk 查看還有 /dev/loop0 的 loopback device 裝置。

```
[root@controller src]# kpartx -d /dev/loop0
[root@controller src]# lsblk /dev/loop0
NAME      MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
loop0       7:0    0 14.7G  0 loop
  loop0p1 259:0    0    2M  0 loop
  loop0p2 259:1    0  158M  0 loop
  loop0p3 259:2    0   14G  0 loop
```

4. losetup -d 移除 image 中的所有 partitions。lsblk 查看 /dev/loop0 不見任何裝置。

```
[root@controller src]# losetup -d /dev/loop0
[root@controller src]# lsblk /dev/loop0
```

Part III

CentOS 8 -> DYW

Chapter 12

開機

12.1 initramfs

1. kernel-core 套件安裝產生的 initramfs 檔會載入目前主機的硬體需要的驅動程式，當完全複製或換開機硬碟到其他電腦，有可能缺驅動程式而無法開機。

2. 系統要製成 image 檔，不以安裝方式建立系統，而是直接移機，面對未知多變的硬體設定，建議重新產生 initramfs。

3. dracut 命令選項 -hostonly 表示只載入目前主機所需的驅動，反之，選項—no-hostonly 則關閉 Host-Only 模式，也就示會載入所有驅動。

```
[root@msi ~]# dracut --help | grep hostonly
  -H, --hostonly        Host-Only mode: Install only what is needed for
  -N, --no-hostonly     Disables Host-Only mode
  --hostonly-mode <mode>
                        Specify the hostonly mode to use. <mode> could
                            be
                        In "sloppy" hostonly mode, extra drivers and
                            modules
  --hostonly-cmdline    Store kernel command line arguments needed
  --no-hostonly-cmdline Do not store kernel command line arguments
      needed
  --no-hostonly-default-device
  --hostonly-i18n       Install only needed keyboard and font files
      according
  --no-hostonly-i18n    Install all keyboard and font files available.
  --hostonly-nics [LIST]
```

4. dracut 以 -no-hostonly 模式重新產生目前開機核心版本的 initramfs。

```
[root@deyu ~]# dracut -N initramfs-`uname -r`.img `uname -r`
```

5. dracut 以 -add-drivers 選項加入 usb 碟驅動程式，重新產生目前開機核心版本的 initramfs，這對 USB 開機很重要。

```
[root@deyu ~]# dracut --add-drivers usb-storage initramfs-`uname -r`.img
    `uname -r`
```

12.2 crashkernel

1. Kdump 是 Linux kernel 的一個功能，在 kernel crash 時 Kdump 會引導另一個 dump-capture kernel，再透過新核心導出和保存內存轉儲，之後可以配合 crash 進行分析。

2. 系統核心啓動時，必須在將要裝入 dump-capture kernel 的地方保留一些空間，並提前載入 dump-capture kernel，因在發生崩潰時，核心已損壞，無法從硬碟讀取任何數據。

3. 保留給 dump-capture kernel 的空間，由開機核心參數 crashkernel 決定，一般設成 auto 由系統自動分配沒什麼問題，會以 kernel-ml-5.14.0 開機時出現以下錯誤訊息：

```
kdump: No memory reserved for crash kernel
```

4. 可修改 crashkernel=128M 解決此一問題，在不更改預設參數重新產生 grub.cfg 檔下，直接修改開機核心參數，必須連 grubenv 檔也要修改。

```
[root@deyu ~]# grep crashkernel=128M -R /boot -l
/boot/grub2/grub.cfg
/boot/grub2/grubenv
/boot/efi/EFI/centos/grubenv
/boot/efi/EFI/centos/grub.cfg
```

Chapter 13

VNC Server Setup

13.1 安裝設定

1. 安裝圖形界面

```
[root@deyu ~]# dnf groupinstall "Server with GUI"
```

2. 安裝 tigervnc server 及 vnc client

```
[root@deyu ~]# dnf install tigervnc-server tigervnc
```

3. 設定開機預設圖形界面

```
[root@deyu ~]# systemctl set-default graphical.target
Removed /etc/systemd/system/default.target.
Created symlink /etc/systemd/system/default.target
→ /usr/lib/systemd/system/graphical.target.
```

13.2 用户設定

1. 在 vncserver.users 增加用户及埠號，:7=dywang 表示用户 dywang 使用埠號 5907。

```
[root@deyu ~]# vim /etc/tigervnc/vncserver.users
[root@deyu ~]# tail -1 /etc/tigervnc/vncserver.users
:7=dywang
```

2. 切換用户 dywang 設定 vnc 連線密碼

```
[root@deyu ~]# su - dywang
[dywang@deyu ~]$ vncpasswd
Password:
Verify:
Would you like to enter a view-only password (y/n)? y
Password:
Verify:
[dywang@deyu ~]$ exit
logout
```

13.3 服務啓動與防火牆

1. 設定開機且馬上啓動 vncserver 服務，其中:7 表示啓動用户 dywang 的 5907 埠號。

```
[root@deyu ~]# systemctl enable --now vncserver@:7.service
Created symlink /etc/systemd/system/multi-user.target.wants/vncserver@
    :7.service
 → /usr/l ib/systemd/system/vncserver@.service.
```

2. 防火牆開啓 5907/tcp 埠號

```
[root@deyu ~]# firewall-cmd --permanent --add-port=5907/tcp
success
[root@deyu ~]# firewall-cmd --reload
success
```

13.4 一帳號多桌面

1. 使用 systemd 管理 vncserver 服務，當 vncserver 啓動後，該帳號即無法登入。若先登入再啓動服務，則服務啓動後馬上關掉。

2. 在登入圖形界面後開啓 vncserver 的目的是爲了做教學示範用，開啓的 vnc 桌面的目前的桌面不是同一個，否則會產生遞迴桌面。

3. 解決上述問題，可使用 vncserver 命令達到目的：

```
[dywang@dyw1 ~]$ XAUTHORITY=~/.Xauthority vncserver :7
```

4. vncviewer 連線 vnc 桌面

```
1 [dywang@dyw1 ~]$ vncviewer 127.0.0.1:5907
```

5. 關閉 vncserver

```
1 [dywang@dyw1 ~]$ vncserver -kill :7
```

Chapter 14

虛擬機控制

14.1 vmcontrol 控制界面

1. 群組安裝 Virtualization Host

```
[root@deyu ~]# dnf groupinstall "Virtualization Host"
```

2. vmcontorl 控制界面使用 python2，CentOS 8 預設安裝 python3，所以要安裝 python2 及 pygtk2。

```
[root@deyu ~]# dnf install python2
[root@deyu ~]# dnf install pygtk2
```

3. 控制界面程式用到 virsh 工具，必須安裝 libvirt-client。

```
[root@deyu ~]# dnf install libvirt-client
```

14.2 virsh net

1. 虛擬機網路無法啓動，錯誤訊息如下：net.ipv6.conf.wlo1.accept_ra n 必須設定成 2。

```
[root@dyw1 ~]# virsh net-start default
error: Failed to start network default
error: internal error: Check the host setup: enabling IPv6 forwarding
    with RA
```

```
routes without accept_ra set to 2 is likely to cause routes loss.
    Interfaces
to look at: wlo1
```

2. 查詢目前 net.ipv6.conf.$netif.accept_ra 的值爲 0。

```
[root@dyw1 ~]# cat /proc/sys/net/ipv6/conf/wlo1/accept_ra
0
```

3. net.ipv6.conf.$netif.accept_ra 可能的值：

```
0 Do not accept Router Advertisements.
1 Accept Router Advertisements if forwarding is disabled.
2 Overrule forwarding behaviour. Accept Router Advertisements even if
    forwarding is enabled.
```

4. sysctl 寫入可生效。

```
[root@dyw1 ~]# sysctl -w net.ipv6.conf.wlo1.accept_ra=2
net.ipv6.conf.wlo1.accept_ra = 2
```

5. 但重新啓動 NetworkManager 後又改回 0，因此開機時無法生效。

```
[root@dyw1 ~]# systemctl restart NetworkManager
[root@dyw1 ~]# cat /proc/sys/net/ipv6/conf/wlo1/accept_ra
0
```

6. 修改 libvirtd 服務的設定，在啓動服務前先將 net.ipv6.conf.wlo1accept_ra 設定成 2。

```
[root@dyw1 ~]# vim /etc/systemd/system/multi-user.target.wants/libvirtd.
    service
[root@dyw1 ~]# grep '^\[Service' -A5 /etc/systemd/system/multi-user.
    target.wants/libvirtd.service
[Service]
Type=notify
EnvironmentFile=-/etc/sysconfig/libvirtd
ExecStartPre=/usr/sbin/sysctl -w net.ipv6.conf.wlo1.accept_ra=2
ExecStart=/usr/sbin/libvirtd $LIBVIRTD_ARGS
ExecReload=/bin/kill -HUP $MAINPID
```

7. 重新載入 libvirtd 服務設定。

```
[root@dyw1 ~]# systemctl daemon-reload
```

8. 重新啓動 libvirtd 服務後，net.ipv6.conf.wlo1accept_ra 設定成 2。

```
[root@dyw1 ~]# systemctl restart libvirtd.service
[root@dyw1 ~]# cat /proc/sys/net/ipv6/conf/wlo1/accept_ra
2
```

Chapter 15

外觀調整

15.1 終端機字型

1. 現在的螢幕解析度都很高，預設的終端機字型太小，設定指令如下：

```
[root@dyw1 ~]# setfont --help
Usage: setfont [write-options] [-<N>] [newfont..] [-m consolemap] [-u
    unicodemap]
  write-options (take place before file loading):
    -o  <filename>  Write current font to <filename>
    -O  <filename>  Write current font and unicode map to <filename>
    -om <filename>  Write current consolemap to <filename>
    -ou <filename>  Write current unicodemap to <filename>
If no newfont and no -[o|O|om|ou|m|u] option is given,
a default font is loaded:
    setfont         Load font "default[.gz]"
    setfont -<N>    Load font "default8x<N>[.gz]"
The -<N> option selects a font from a codepage that contains three fonts
    :
    setfont -{8|14|16} codepage.cp[.gz]   Load 8x<N> font from codepage.
        cp
Explicitly (with -m or -u) or implicitly (in the fontfile) given
    mappings
will be loaded and, in the case of consolemaps, activated.
    -h<N>       (no space) Override font height.
    -m <fn>     Load console screen map.
    -u <fn>     Load font unicode map.
    -m none     Suppress loading and activation of a screen map.
    -u none     Suppress loading of a unicode map.
    -v          Be verbose.
    -C <cons>   Indicate console device to be used.
    -V          Print version and exit.
Files are loaded from the current directory or /lib/kbd/*/.
```

2. setfont 的輔助說明，字型目錄在 /lib/kbd/*/。

```
[root@dyw1 ~]# ll /lib/kbd/
total 20
drwxr-xr-x. 3 root root 8192 Jun 27 06:15 consolefonts
drwxr-xr-x. 2 root root 4096 Jun 27 06:15 consoletrans
drwxr-xr-x. 4 root root   31 Jun 27 06:15 keymaps
drwxr-xr-x. 2 root root 4096 Jun 27 06:15 unimaps
```

3. 設定字型

```
[root@dyw1 ~]# setfont -v /lib/kbd/consolefonts/sun12x22.psfu.gz
```

4. 將設定寫到 /etc/locale.conf，開機立即生效。

```
[root@dyw1 ~]# cat /etc/locale.conf
LANG="en_US.UTF-8"
SYSFONT="sun12x22.psfu"
```

15.2 客製應用選單

1. 編輯.desktop 檔，如果沒有 root 權限，可放在家目錄下 ~/.local/share/applications。

```
[root@dyw1 ~]# cat /usr/share/applications/rhcsa8vmctl.desktop
[Desktop Entry]
Version=1.0
Encoding=UTF-8
Name=RHCSA8 Control
Type=Application
Terminal=false
Name=RHCSA8 Control
Exec=/var/ftp/pub/bin/kvmcontrol.py RHCSA8
Icon=virt-viewer
GenericName=RHCSA8 Control
```

2. 查詢預設選單

```
[dywang@dyw1 ~]$ dconf read /org/gnome/shell/favorite-apps
[dywang@dyw1 ~]# gsettings get org.gnome.shell favorite-apps
['firefox.desktop', 'evolution.desktop', 'rhythmbox.desktop'
, 'shotwell.desktop', 'org.gnome.Nautilus.desktop'
```

```
5 , 'org.gnome.Software.desktop', 'yelp.desktop', 'gnome-terminal.desktop'
    ]
```

3. 設定客制選單

```
1 [dywang@dyw1 ~]# gsettings set org.gnome.shell favorite-apps "\
  ['firefox.desktop', 'rhcsa8vmctl.desktop', 'rhce8vmctl.desktop', \
3 'org.gnome.Terminal.desktop', 'vncviewer.desktop',
  'org.gnome.Nautilus.desktop']"
```

4. 查詢目前選單

```
  [dywang@deyu ~]$ gsettings get org.gnome.shell favorite-apps
2 ['firefox.desktop', 'rhcsa8vmctl.desktop', 'rhce8vmctl.desktop',
  'org.gnome.Terminal.desktop', 'vncviewer.desktop', 'org.gnome.Nautilus.
     desktop']
4 [dywang@deyu ~]$ dconf read /org/gnome/shell/favorite-apps
  ['firefox.desktop', 'rhcsa8vmctl.desktop', 'rhce8vmctl.desktop',
6 'org.gnome.Terminal.desktop', 'vncviewer.desktop', 'org.gnome.Nautilus.
     desktop']
```

5. 關閉螢幕鎖定

```
[dywang@deyu ~]$ gsettings set org.gnome.desktop.session idle-delay 0
```

15.3 電池低電量提醒

1. CentOS 8 預設低電量提醒預設是 10，若有 root 權限，可修改 UPower.conf 的 PerventageLow 參數，再重新啓動 upower 服務。

```
1 [root@msi ~]# vim /etc/UPower/UPower.conf
  [root@msi ~]# grep ^PercentageLow /etc/UPower/UPower.conf
3 PercentageLow=20
  [root@msi ~]# systemctl restart upower.service
```

15.4 Gnome Session

1. CentOS 8 登入時按「Sign in」左邊的設定 icon，可以選擇 gnome 的類型，預設 gnome-classic，桌面會跟 gnome 2 一樣，選 Standard 才會出現 gnome 3 的桌面，選擇設定後會寫入 /var/lib/AccountsService/users/ 目錄下的個人設定檔，例如帳號 dywang，Session=gnome 表示使用 standard gnome，改成 Session=gnome-classic 則使用類 gnome2 桌面。

```
[root@msi ~]# cat /var/lib/AccountsService/users/dywang
[com.redhat.AccountsServiceUser.System]
id='centos'
version-id='8'

[User]
Language=en_US.UTF-8
Session=gnome
Icon=/usr/share/pixmaps/faces/tree.jpg
SystemAccount=false
```

15.5 Firefox 預設

1. 用户開啓 firefox 後可自行設定，也可修改 firefox 初始設定，讓第一次開啓 firefox 就使用此設定，可修改 all-redhat.js，下例設定 density compat，hide titlebar。

```
[root@dyw1 ~]# grep ' dywang' -A2 /usr/lib64/firefox/browser/defaults/\
preferences/all-redhat.js
/* dywang */
pref("browser.uidensity", 1);
pref("browser.tabs.drawInTitlebar", true);
```

2. 查詢 plugins.power 可設定的項目。

```
[dywang@msi ~]$ gsettings list-keys org.gnome.settings-daemon.plugins.
    power
power-button-action
idle-dim
sleep-inactive-ac-type
sleep-inactive-battery-timeout
sleep-inactive-battery-type
sleep-inactive-ac-timeout
ambient-enabled
idle-brightness
```

15.6 cockpit.scoket

1. cockpit 是 web 式的系統管理工具，ssh 登入 CentOS 8 後，會提示要啓用 cockpit 管理工具，必須 enable cockpit.socket。

```
[root@dyw1 ~]# ssh localhost
Activate the web console with: systemctl enable --now cockpit.socket

Last login: Sat Jul 10 07:36:47 2021 from ::1
```

2. 移除 /etc/motd.d/cokpit 後，登入就不會有此提示。

```
[root@dyw1 ~]# mv /etc/motd.d/cockpit .
[root@dyw1 ~]# ssh localhost
Last login: Sat Jul 10 08:13:58 2021 from ::1
```

15.7 iBus 輸入法

1. 問題：iBus 輸入切換中文輸入，沒找到匹配的字時，不符合的碼以紅色警示，此時按「super+space」切回英文輸入，游標不見。

2. 解決：取消註解 WaylandEnable=false，改用 X11 後正常。

```
[root@msi ~]# cat /etc/gdm/custom.conf
# GDM configuration storage

[daemon]
# Uncoment the line below to force the login screen to use Xorg
WaylandEnable=false

[security]

[xdmcp]

[chooser]

[debug]
# Uncomment the line below to turn on debugging
#Enable=true
```

3. almalinux 9 el9 套件已修正，使用 Wayland+gnome-terminal+ibus 不會有此問題。

Part IV

DYW6 NAT

Chapter 16

NAT 自動安裝實例

16.1 檔案收集

1. 下載 DYW Linux iso 光碟檔。

```
[root@dywH ~]# cd /usr/src
[root@dywH src]# wget --content-disposition \
http://dywang.csie.cyut.edu.tw/moodle23/pluginfile.php/1/blog/attachment
    /307/crtnokvm20131015.iso
```

2. 不燒光碟，直接掛載 iso 檔。

```
[root@dywH src]# mkdir natiso
[root@dywH src]# mount -o loop crtnokvm20140222.iso natiso
[root@dywH src]# ls natiso/
add  CentOS_BuildTag  EULA  images    Packages                  repodata
bin  EFI              GPL   isolinux  RELEASE-NOTES-en-US.html  TRANS.
    TBL
```

3. 因爲掛載的光碟只能讀不能寫，所以必須複製到新目錄，才能進行修改。

```
[root@dywH src]# cp -a natiso nat
[root@dywH src]# ls nat
add  CentOS_BuildTag  EULA  images    Packages                  repodata
bin  EFI              GPL   isolinux  RELEASE-NOTES-en-US.html  TRANS.
    TBL
```

4. 修改安裝選單設定檔

```
[root@dywH src]# vim nat/isolinux/isolinux.cfg
........
label nat
  menu label Install ^NAT
  menu default
  kernel vmlinuz
  append load_ramdisk=1 initrd=initrd.img ks=cdrom:/add/nat-ks.cfg
```

5. 自動安裝設定檔及套件檔更名

```
[root@dywH src]# cd nat/add
[root@dywH add]# mv crt-ks.cfg nat-ks.cfg
[root@dywH add]# mv crtpack natpack
```

16.2 NAT kickstart 命令階段

1. 自動安裝檔 ks=cdrom:/add/nat-ks.cfg，自動安裝檔格式參考9。設定 kickstart 爲安裝。

```
[root@dywH add]# vim nat-ks.cfg
install
```

2. 設定語系、鍵盤及時區，若不設定，安裝過程會出現互動式視窗，要求用户選擇。

```
[root@dywH add]# vim nat-ks.cfg
lang en_US.UTF-8
keyboard us
timezone --utc Asia/Taipei
```

3. 預設 NAT 對內網卡 eth0，ip 爲 192.168.1.254，遮罩爲 255.255.255.0。對外網卡爲 eth1，ip 不可能固定，一定要用户自行輸入，但因 kickstart 互動式設定網路參數 query 無法正常動作，故於 %post 安裝後處理設計互動式設定，請參考105。

```
[root@dywH add]# vim nat-ks.cfg
network --device eth0 --bootproto=static --ip=192.168.1.254 --netmask
    =255.255.255.0
```

```
network --device eth1 --bootproto=query
```

4. 開放自動安裝過程，用户自行設定密碼，也就是互動式設定 root 密碼，必須註解或刪除 rootpw 設定。

```
[root@dywH add]# vim nat-ks.cfg
#rootpw  123123
```

5. 關閉 kdump 服務，啓動 dhcpd, named 及 ntpd 服務，伺服務的系統時間非常重要，一定要準確，所以必須啓動 ntpd 服務來自動校時。

```
[root@dywH add]# vim nat-ks.cfg
services --disabled="kdump"
services --enabled="dhcpd,named,ntpd"
```

6. 設定防火牆放行 ssh、認證啓動、selinux 啓動。

```
[root@dywH add]# vim nat-ks.cfg
firewall --service=ssh
authconfig --enableshadow --passalgo=sha512 --enablefingerprint
selinux --enforcing
```

7. 加入硬碟自動分割檔，這個檔是在 kickstart 預處理 %pre 階段，偵測硬碟後才能確定，請參考103。

```
[root@dywH add]# vim nat-ks.cfg
%include /tmp/partitioning
```

8. 取消安裝完成後自動重新啓動。

```
[root@dywH add]# vim nat-ks.cfg
#reboot
```

16.3 NAT kickstart 安裝套件階段

1. 爲盡量簡化安裝套件，不包含基礎套件，這個動作可能會遺漏重要套件，但因 DYW Linux 已將所需套件整理並另存套件列表，故可加入--nobase 選項。

```
[root@dywH add]# vim nat-ks.cfg
%packages --nobase
%end
```

2. 透過最小安裝，再逐步增加 NAT 所需套件，整理出最小安裝套件 284 個，存放於 natpack，故設計於預處理階段103 中匯入。

```
[root@dywH add]# vim nat-ks.cfg
%packages --nobase
%include /tmp/natpack
%end
```

3. 不需要安裝的套件，也可於行首加入減號。

```
[root@dywH add]# vim nat-ks.cfg
%packages --nobase
%include /tmp/natpack
-libgcj
-sinjdoc
-java-1.5.0-gcj
%end
```

4. nat 最小安裝套件列表 natpack 檔下載。

16.4 NAT kickstart 預處理階段

1. 預處理記錄在 /tmp/kspre

```
[root@dywH add]# vim nat-ks.cfg
%pre --log=/tmp/kspre
%end
```

2. 檢查安裝來源，必須有套件列表檔 natpack，並將其存在 /tmp/natpack，讓安裝套件階段匯入。

```
[root@dywH add]# vim nat-ks.cfg
%pre --log=/tmp/kspre
mkdir /tmp/crt
srmp=$(grep 'sr' /etc/mtab | awk '{print $2}')
for mp in $srmp ; do
    if [ -e $mp/add/natpack ]; then
        cat $mp/add/natpack > /tmp/natpack
        echo "cdrom $mp" > /tmp/install
        sdfound="${mp##/*/}"
        break
    fi
done
%end
```

3. 將找到安裝來源光碟訊息，顯示在第 2 終端機。你可以在安裝過程以 Ctrl+Alt+F2 切換到 tty2 查看。

```
[root@dywH add]# vim nat-ks.cfg
%pre --log=/tmp/kspre
.....
cat /tmp/install > /dev/tty2
%end
```

4. 找看看有沒有超過 7.9G 的硬碟或隨身碟，若有則建立硬碟分割檔，供命令階段匯入並自動分割。注意！這是自動分割硬碟，硬碟中的任何資料都會被清除，所以使用此光碟前，請先確定硬碟或隨身碟的資料是否備份或不再使用。

```
[root@dywH add]# vim nat-ks.cfg
%pre --log=/tmp/kspre
.....
echo -e '\c' > /tmp/partitioning
lsdisk=$(ls -d /dev/{sd?,vd?} 2>/dev/null)
for ld in ${lsdisk}; do
    Dbyte=$( fdisk -l  $ld | egrep '^Disk.*bytes$' )
    Dbyte=${Dbyte##*B, }; Dbyte=${Dbyte% bytes}
    declare -i isize=$Dbyte
    if [ $isize -gt 7900000000 ] ; then
        cat > /tmp/partitioning << END
bootloader --location=mbr --driveorder=$ld
zerombr
clearpart --initlabel --all --drives=$ld
part /boot --size=200 --label=nat-boot --fstype=ext4
part pv.01 --size=7000
volgroup vg_nat --pesize=4096 pv.01
logvol / --fstype=ext4 --name=root --vgname=vg_nat --size=4000
logvol /home --fstype=ext4 --name=home --vgname=vg_nat --size=1024
logvol swap --name=swap --vgname=vg_nat --size=1024
```

```
END
        break
    fi
done
%end
```

16.5 NAT kickstart 後處理 nochroot 階段

1. 後處理有兩種狀況，加入 --nochroot 選項，根目錄維持在最外層的安裝來源系統。利用此選項可以方便複製安裝來源端的檔案到已安裝的新系統中。因爲沒有 chroot 到安裝的新系統，而新系統的目錄在 /mnt/sysimage，所以記錄檔也必須加入此前導目錄，否則記錄會寫在安裝來源端，重新啓動安裝好的系統，到 /tmp 下查不到 ksnochrootpost。

```
[root@dywH add]# vim nat-ks.cfg
%post --nochroot --log=/mnt/sysimage/tmp/ksnochrootpost
%end
```

2. 來源光碟在安裝過程，掛載於 /mnt/source，可將存於目錄 bin 下，自行設計的腳本，直接複製到新系統的 /usr/sbin 目錄。

```
[root@dywH add]# vim nat-ks.cfg
%post --nochroot --log=/mnt/sysimage/tmp/ksnochrootpost
INSTALL_ROOT='/mnt/sysimage'
cp /mnt/source/bin/*.sh $INSTALL_ROOT/usr/sbin/
%end
```

16.6 NAT kickstart 後處理階段

1. 後處理沒有加入 --nochroot 選項，就是將根目錄切換到已安裝的新系統中。也就是此時所作的任何動作或命令，都是針對新安裝的系統。設定執行結果記錄在 /tmp/kspost。

```
[root@dywH add]# vim nat-ks.cfg
%post --log=/kspost
%end
```

2. 修改啓動選單，取消隱藏選單，修改選單抬頭。

```
[root@dywH add]# vim nat-ks.cfg
%post --log=/kspost
sed -i 's/\(^hiddenmenu\).*$/#\1/' /boot/grub/grub.conf
sed -i 's/\(^title De-Yu Wang\).*$/\1 -- CSIE NAT/' /boot/grub/grub.conf
%end
```

3. NAT 必須啓動 ip forward，才能讓內部 ip 連上 internet。

```
[root@dywH add]# vim nat-ks.cfg
%post --log=/kspost
sed -i 's/\(^net.ipv4.ip_forward =\).*$/\1 1/g' /etc/sysctl.conf
%end
```

4. 由於對外網卡一定要以互動式設定，先切換到第 1 終端機，設定變數 curTTY 爲目前的終端機，最後再設定腳本的 I/O 在此終端機。

```
[root@dywH add]# vim nat-ks.cfg
%post --log=/kspost
chvt 1
curTTY=`tty`
exec < $curTTY > $curTTY 2> $curTTY
%end
```

5. 設定對內 DHCP 網卡爲 eth0，對外網卡爲 eth1。

```
[root@dywH add]# vim nat-ks.cfg
%post --log=/kspost
ethdhcp='eth0'  ## Internal Network
ethint='eth1'   ## External Network
echo -e "# Command line options here\nDHCPDARGS=\"$ethdhcp\"" > /etc/
    sysconfig/dhcpd
%end
```

6. 對內網卡於安裝過程已自動設定，設計參數輸入迴圈，取得對外網卡參數。

```
[root@dywH add]# vim nat-ks.cfg
%post --log=/kspost
answer="n"
while [ x"$answer" != "xy" ] && [ x"$answer" != "xY" ] ; do
    echo -n "enter hostname (nat): "; read hostname
    [ "$hostname" == "" ] && hostname='nat'
```

```
    echo -n "enter ip: "; read ip
    echo -n "enter netmask (255.255.255.0): "; read netmask
    [ "$netmask" == "" ] && netmask='255.255.255.0'
    echo -n "enter default gw: "; read gw
    echo

    echo You entered:
    echo -e "\thostname: $hostname"
    echo -e "\tip: $ip"
    echo -e "\tnetmask: $netmask"
    echo -e "\tdefault gw: $gw"
    echo -n "Is this correct? [y/n] "; read answer
done
%end
```

7. 以用户輸入且確認的參數，設定 NAT 主機及對外網卡。

```
[root@dywH add]# vim nat-ks.cfg
%post --log=/kspost
sed -i -e 's/^\(HOSTNAME=\).*$/\1'"$hostname"'/' /etc/sysconfig/network
cat > /etc/sysconfig/network-scripts/ifcfg-${ethint} << END
DEVICE='eth1'
BOOTPROTO='static'
NM_CONTROLLED=no
ONBOOT=yes
IPADDR=$ip
NETMASK=$netmask
GATEWAY=$gw
DNS1=163.17.3.1
DNS2=163.17.1.1
END
%end
```

8. NAT 中 dhcp 必須提供 dns，若內部不需要，也必須架設，單純爲內部 ip 查詢 doamin name 進行 forward。

```
[root@dywH add]# vim nat-ks.cfg
%post --log=/kspost
cat > /etc/named.conf << END
// named.conf for NAT
//
// Provided by Red Hat bind package to configure the ISC BIND named(8)
    DNS
// server as a caching only nameserver (as a localhost DNS resolver only
    ).
//
// See /usr/share/doc/bind*/sample/ for example named configuration
    files.
//
```

```
11
options {
13      listen-on port 53 { any; };
        listen-on-v6 port 53 { ::1; };
15      directory   "/var/named";
        dump-file   "/var/named/data/cache_dump.db";
17      statistics-file "/var/named/data/named_stats.txt";
        memstatistics-file "/var/named/data/named_mem_stats.txt";
19      allow-query  { any; };
        recursion yes;
21
        dnssec-enable yes;
23      dnssec-validation yes;
        dnssec-lookaside auto;
25
        /* Path to ISC DLV key */
27      bindkeys-file "/etc/named.iscdlv.key";

29      forward only;
        forwarders {
31          163.17.3.1;
            168.95.1.1;
33          139.175.10.20;
        };
35  };
    END
37  %end
```

9. 設定 DHCP 參數。

```
1   [root@dywH add]# vim nat-ks.cfg
    %post --log=/kspost
3   cat > /etc/dhcp/dhcpd.conf << END
    #
5   # DHCP Server Configuration file.
    #   see /usr/share/doc/dhcp*/dhcpd.conf.sample
7   #   see 'man 5 dhcpd.conf'
    #
9   authoritative;
    ddns-update-style none;
11
    subnet 192.168.1.0 netmask 255.255.255.0 {
13  #   The following lines are standard all of the time.
        option routers 192.168.1.254;
15      option subnet-mask 255.255.255.0;
        option domain-name "deyu.wang";
17      option domain-name-servers 192.168.1.254,163.17.3.1,168.95.1.1;
        default-lease-time 600;
19      max-lease-time 720;
        range 192.168.1.100 192.168.1.199;
21      next-server 192.168.1.254;
    }
```

```
23 END
%end
```

10. 增加校內及校外兩台 ntp server，進行校時。

```
[root@dywH add]# vim nat-ks.cfg
2 %post --log=/kspost
sed -i 's/^\(server 0\)/server 163.17.1.46\nserver tock.stdtime.gov.tw\n
    \1/' /etc/ntp.conf
4 %end
```

11. 增加一般使用者，並設定其密碼。

```
[root@dywH add]# vim nat-ks.cfg
2 %post --log=/kspost
useradd csielabnat
4 passwd csielabnat
%end
```

12. 防火牆的設定爲 NAT 主機的主角，因此爲資工系電腦教室，特別撰寫設定防火牆腳本，已於安裝 nochroot 後處理階段，複製到 /usr/sbin。爲提供帳號 csielabnet 可以使用 root 權限設定防火牆，必須在 sudoers 中加入此帳號爲可以免密碼執行防火牆設定，特別注意！NOPASSWD 冒號後一定要加絕對路徑。

```
1 [root@dywH add]# vim nat-ks.cfg
%post --log=/kspost
3 mv /etc/sysconfig/iptables /etc/sysconfig/iptables.orig
echo "setdhcpiptables.sh $ethdhcp $ethint" >> /etc/rc.d/rc.local
5 echo "csielabnat    ALL=NOPASSWD:/usr/sbin/setdhcpiptables.sh" >> /etc/
    sudoers
%end
```

13. 限制用户 csielabnat 只能在內部網路登入，以避免老師在外部網路設定防火牆，影響正在上課的老師。

```
[root@dywH add]# vim nat-ks.cfg
2 %post --log=/kspost
echo 'AllowUsers csielabnat@192.168.1.*' >> /etc/ssh/sshd_config
4 %end
```

14. 設定每天 8:00, 13:00, 18:00，防火牆設定回開放上網，以避免老師上課時限制上網的設定，延續下去，影響到下次上課的老師。

```
[root@dywH add]# vim nat-ks.cfg
%post --log=/kspost
echo "0 8,13,18 * * * /usr/sbin/setdhcpiptables.sh $ethdhcp $ethint" >>
    /var/spool/cron/root
%end
```

15. 回到第 6 終端機圖形安裝界面，按下 reboot 重新啓動。

```
[root@dywH add]# vim nat-ks.cfg
%post --log=/kspost
chvt 6
%end
```

16. nat 安裝 kickstart 設定檔下載。

16.7 防火牆 iptables 設定

1. 防火牆腳本規劃：不輸入參數預設爲全開，所有用户皆可連上網際網路，選項 --set 設定四種狀況，一爲 close 完全關閉網路、二爲 csie 只能連上校內網路、三爲 dywnag 只能連上 De-Yu Wang 自行規劃設定的網站、四爲只能連上某一指定的 ip。選項 --myip 可以指定某一 ip 不受管制，可以連上網際網路。要查看這些選項說明，可以使用 -h 選項。

```
[root@dywH bin]# vim setdhcpiptables.sh
#!/bin/bash

if ip=$(echo $@ | grep -o "\-h") ; then
    echo "ex. $0 [eth_dhcp eth_int] [--set=[close|csie|dywang]] [--myip
        =112]"
    echo "Without any arguments, allows all users connected to the
        Internet."
    echo "eth_dhcp eth_int : internal nic external nic"
    echo "--set=close : can NOT connect to the Internet."
    echo "--set=csie : can ONLY connect to the domain CYUT."
    echo "--set=dywang : can ONLY connect to the ip specified by De-Yu
        Wang."
    echo "--set=163.17.10.1 : can ONLY connect to the ip 163.17.10.1."
    echo "--myip=111 : my ip 192.168.1.111 CAN connect to the Internet."
    exit 1
fi
```

2. 腳本保留變換對內對外網卡的設定，沒有網卡參數，預設爲對內 eth0，對外 eth1。

```
[root@dywH bin]# vim setdhcpiptables.sh

if eth=$(echo $@ | grep -o "eth[01] eth[01]") ; then
    ethdhcp=${eth% *}
    ethint=${eth#* }
else
    ethdhcp=eth0
    ethint=eth1
fi
echo "$ethdhcp,$ethint"
```

3. 針對用户指定的參數，修改 iptables。

```
[root@dywH bin]# vim setdhcpiptables.sh

iptable='/etc/sysconfig/iptables'
cat > $iptable <<END
# Firewall configuration written by system-config-firewall
# Manual customization of this file is not recommended.
# 21(vsftpd) 22(sshd) 53(named) 69(tftp) dhcpd(67) 80(httpd)
    111,2049,875,9001:9005(nfs) 123(ntpd) 389(ldap) 3260(tgtd)
    5000:5005(vsftpd pasv)
*filter
:INPUT ACCEPT [0:0]
:FORWARD ACCEPT [0:0]
:OUTPUT ACCEPT [0:0]
-A INPUT -m state --state ESTABLISHED,RELATED -j ACCEPT
-A INPUT -p icmp -j ACCEPT
-A INPUT -i lo -j ACCEPT
-A INPUT -m state --state NEW -s 192.168.1.0/24 -j ACCEPT
-A INPUT -m state --state NEW -m tcp -p tcp --dport 22 -j ACCEPT
-A INPUT -j REJECT --reject-with icmp-host-prohibited
END
if myip=$(echo $@ | grep -o "\-\-myip=[0-9]\{1,3\}") ; then
    myip=${myip#*=}
    echo "-A FORWARD -i $ethdhcp -s 192.168.1.${myip} -j ACCEPT" >>
        $iptable
    echo "192.168.1.${myip}"
fi
if ip=$(echo $@ | grep -o "\-\-set
    =[0-9]\{1,3\}\.[0-9]\{1,3\}\.[0-9]\{1,3\}\.[0-9]\{1,3\}") ; then
    echo "-A FORWARD -i $ethdhcp -d ${ip##*=} -j ACCEPT" >> $iptable
    echo "-A FORWARD -i $ethdhcp -d 213.108.252.185 -j ACCEPT" >>
        $iptable
    echo "-A FORWARD -i $ethdhcp -j DROP" >> $iptable
elif ip=$(echo $@ | grep -o "\-\-set=close") ; then
    echo "-A FORWARD -i $ethdhcp -j DROP" >> $iptable
elif ip=$(echo $@ | grep -o "\-\-set=csie") ; then
```

```
    echo "-A FORWARD -i $ethdhcp -d 163.17.0.0/16 -j ACCEPT" >> $iptable
32  echo "-A FORWARD -i $ethdhcp -d 120.110.0.0/16 -j ACCEPT" >>
        $iptable
    echo "-A FORWARD -i $ethdhcp -d 213.108.252.185 -j ACCEPT" >>
        $iptable
34  echo "-A FORWARD -i $ethdhcp -j DROP" >> $iptable
elif ip=$(echo $@ | grep -o "\-\-set=dywang") ; then
36  echo "-A FORWARD -i $ethdhcp -d 163.17.27.245 -j ACCEPT" >> $iptable
    echo "-A FORWARD -i $ethdhcp -d 213.108.252.185 -j ACCEPT" >>
        $iptable
38  echo "-A FORWARD -i $ethdhcp -d 163.17.10.68 -j ACCEPT" >> $iptable
    echo "-A FORWARD -i $ethdhcp -d 163.17.10.1 -j ACCEPT" >> $iptable
40  echo "-A FORWARD -i $ethdhcp -d 163.17.10.64 -j ACCEPT" >> $iptable
    echo "-A FORWARD -i $ethdhcp -d 163.17.10.53 -j ACCEPT" >> $iptable
42  echo "-A FORWARD -i $ethdhcp -d 163.17.10.58 -j ACCEPT" >> $iptable
    echo "-A FORWARD -i $ethdhcp -d 163.17.10.5 -j ACCEPT" >> $iptable
44  echo "-A FORWARD -i $ethdhcp -d 163.17.1.70 -j ACCEPT" >> $iptable
    echo "-A FORWARD -i $ethdhcp -d 195.210.29.1 -j ACCEPT" >> $iptable
        #zetcode
46  echo "-A FORWARD -i $ethdhcp -d 209.132.180.176 -j ACCEPT" >>
        $iptable #pygtk
    echo "-A FORWARD -i $ethdhcp -d 66.155.39.106 -j ACCEPT" >> $iptable
         #pygtk
48  echo "-A FORWARD -i $ethdhcp -d 184.168.65.89 -j ACCEPT" >> $iptable
         #tutorialspoint
    echo "-A FORWARD -i $ethdhcp -j DROP" >> $iptable
50  else
    echo -e "-A FORWARD -i $ethdhcp -j ACCEPT" >> $iptable
52  fi
    cat >> $iptable <<END
54  -A FORWARD -o $ethdhcp -d 192.168.1.0/24 -j ACCEPT
    -A FORWARD -o $ethdhcp -j DROP
56  -A FORWARD -j REJECT --reject-with icmp-host-prohibited
    COMMIT
58  *nat
    #-A POSTROUTING -s 192.168.1.0/24 -o $ethint -j SNAT --to 120.110.10.84
60  -A POSTROUTING -o $ethint -j MASQUERADE

62  COMMIT
    END
```

4. 重新啓動 iptables，並退出腳本。

```
1   [root@dywH bin]# vim setdhcpiptables.sh

3   /etc/init.d/iptables restart
    exit 0
```

5. setdhcpiptables.sh 腳本下載。

16.8 NAT 安裝光碟瘦身與製作

1. 將下載的光碟修改相關設定檔，加入自行設計的腳本，重新製作安裝光碟，就可以依照您設定的安裝方式安裝。如果下載光碟 1G，重新製作的光碟也不可能小於 1G。既然已經花時間找出 NAT 安裝最基本套件，沒用到的套件必須移除，才能把光碟做到最小。即使往後需要擴增其他功能，也只要連上網路安裝就可以了。

2. 建立套件暫存目錄。

```
[root@dywH ~]# cd /usr/src/nat
[root@dywH nat]# mkdir packtmp
```

3. 將用到的套件移到新目錄，光碟中缺的套件則列印出來，結果只缺 dhcp 套件。

```
[root@dywH nat]# for p in $(cat add/natpack); do
> if ! mv -f Packages/$p-[0-9]*[^6].rpm packtmp/; then
> echo $p
> fi
> done
mv: cannot stat `Packages/dhcp-[0-9]*[^6].rpm': No such file or
    directory
dhcp
```

4. 從 DYW repo server 下載 dhcp 套件。

```
[root@dywH nat]# wget http://dywang.csie.cyut.edu.tw/centos6/Packages/
    dhcp-4.1.1-12.P1.el6.x86_64.rpm \
-P Packages
```

5. 若要使用虛擬機模擬安裝，必須從 DYW repo server 下載 qemu-kvm-rhev 套件。

```
[root@dywH nat]# wget http://dywang.csie.cyut.edu.tw/centos6/ospackages/
    qemu-kvm-rhev-0.12.1.2-2.355.el6_4.5.x86_64.rpm \
-P Packages
```

6. 因套件內容已更動，必須重新建立 repo 資料表。

```
[root@dywH nat]# createrepo -g repodata/comps.xml --update /usr/src/nat
285/285 - Packages/mingetty-1.08-4.1.el6.x86_64.rpm
Saving Primary metadata
Saving file lists metadata
Saving other metadata
```

7. 建立新的 NAT 安裝光碟。

```
[root@dywH nat]# mkisofs -o /usr/src/nat`date +%Y%m%d`.iso -b isolinux/
    isolinux.bin \
-c isolinux/boot.cat -no-emul-boot -boot-load-size 4 \
-boot-info-table -R -J -v -T /usr/src/nat
```

16.9 虛擬機模擬

1. 可以先用虛擬機開機測試，避免光碟燒錄的浪費。但 NAT 需要兩張網卡，虛擬機預設只有一張名爲 default 的網卡，必須再新增一張。所以先將 default 網卡的參數檔 default.xml 複製，名爲 net1.xml，也就是新增一張名爲 net1 的網卡。

```
[root@dyw219 ~]# cd /etc/libvirt/qemu/networks/
[root@dyw219 networks]# cp default.xml net1.xml
[root@dyw219 networks]# ll
total 16
drwx------. 2 root root 4096 Jun  5  2013 autostart
-rw-r--r--. 1 root root  257 Dec 26 09:23 default.xml
-rw-r--r--. 1 root root  169 Feb 27 16:02 net1.xml
```

2. 修改新增的網卡 net1。

```
[root@dyw219 networks]# vim net1.xml
<network>
  <name>net1</name>
  <bridge name="virbr1" />
  <forward/>
  <domain name="deyu.wang"/>
  <ip address="10.10.0.1" netmask="255.255.255.0">
  </ip>
</network>
```

3. 以 net1.xml 新增虛擬機網卡 net1。

```
[root@dyw219 networks]# virsh net-create net1.xml
Network net1 created from net1.xml
```

4. 或者要直接重新啓動 libvirtd 服務也可以。

```
[root@dyw219 networks]# /etc/init.d/libvirtd restart
Stopping libvirtd daemon:                                  [  OK  ]
Starting libvirtd daemon:                                  [  OK  ]
```

5. 查看虛擬機網路，net1 存在但尚未啓動，且不自動啓動。

```
[root@dyw219 networks]# virsh net-list --all
Name                 State      Autostart
-----------------------------------------
default              active     yes
net1                 inactive   no
```

6. 啓動 net1。

```
[root@dyw219 networks]# virsh net-start net1
Network net1 started
```

7. 如果啓動 net1 失敗，先關閉 dnsmasq，再啓動 net1。

```
[root@dyw219 networks]# /etc/init.d/dnsmasq stop
```

8. 再查看虛擬機網路，兩張網卡皆已啓動。

```
[root@dyw219 networks]# virsh net-list --all
Name                 State      Autostart
-----------------------------------------
default              active     yes
net1                 active     no
```

9. 可以先用虛擬機開機測試，避免光碟燒錄的浪費。如果已經安裝虛擬機 crtusb，必須先關機、刪除並移除映像檔。

```
[root@dywH ~]# virsh destroy crtusb
[root@dywH ~]# virsh undefine --snapshots-metadata --managed-save crtusb
[root@dywH ~]# rm -f /var/lib/libvirt/images/crtusb.img
[root@dywH ~]# virt-install --accelerate --name crtusb --ram 1024 \
--disk path=/var/lib/libvirt/images/crtusb.img,size=8,bus=virtio \
--cdrom=/usr/src/nat`date +%Y%m%d`.iso \
--network network=default --network network=net1
```

10. 爲免去每模擬一次，就分別執行好幾行程式，可以使用分號';' 連續執行。NAT 虛擬機安裝影片。

```
[root@dywH ~]# virsh destroy crtusb; \
virsh undefine --snapshots-metadata --managed-save crtusb; \
rm -f /var/lib/libvirt/images/crtusb.img; \
virt-install --accelerate --name crtusb --ram 1024 \
--disk path=/var/lib/libvirt/images/crtusb.img,size=8,bus=virtio \
--cdrom=/usr/src/nat`date +%Y%m%d`.iso \
--network network=default --network network=net1
```

11. natxxxxxx.iso ISO 檔下載。

```
[root@dywH ~]# ll /usr/src/nat*.iso
-rw-r--r--. 1 root root 370454528 Feb 25 10:50 /usr/src/nat20140227.iso
```

12. 掃瞄光碟，確認光碟的 bus 爲 3,0,0。

```
[root@dywH ~]# cdrecord -scanbus
3,0,0 300) 'ATAPI ' 'DVD A DH16AAS ' 'JA21' Removable CD-ROM
```

13. 燒錄光碟

```
[root@dywH ~]# cdrecord -v -dao dev=3,0,0 /usr/src/nat`date +%Y%m%d`.iso
```

16.10 NAT Throughput

1. Throughput（吞吐量）表示的是 NAT 每秒能處理的資料量。

2. NAT 的 Throughput 是 LAN-to-WAN 的 Throughput，而不是 LAN-to-LAN。LAN 是指內部網路，WAN 則是外部網路。爲測試 LAN-to-WAN，要在 NAT 內外測試端都安裝 Throughput 測試工具 iperf 安裝。

```
[root@dyw219 ~]# yum install iperf -y

[root@deyu ~]# yum install iperf -y
```

3. 外部測試機作爲 iperf server 並啓動。

```
[root@dyw219 ~]# iperf -s
------------------------------------------------------------
Server listening on TCP port 5001
TCP window size: 85.3 KByte (default)
------------------------------------------------------------
```

4. 內部測試機作爲 iperf client 並連上外部測試機，測得速度每秒 109Mbytes，頻寬 91.5 Mbits/sec。

```
[root@deyu ~]# iperf -c 163.17.27.219
------------------------------------------------------------
Client connecting to 163.17.27.219, TCP port 5001
TCP window size: 16.0 KByte (default)
------------------------------------------------------------
[  3] local 192.168.1.148 port 34471 connected with 163.17.27.219 port
   5001
[ ID] Interval       Transfer     Bandwidth
[  3]  0.0-10.0 sec   109 MBytes  91.5 Mbits/sec
```

5. 回到外部 iperf server，同樣可以觀察到近似的結果。

```
[root@dyw219 ~]# iperf -s
------------------------------------------------------------
Server listening on TCP port 5001
TCP window size: 85.3 KByte (default)
------------------------------------------------------------
[  4] local 163.17.27.219 port 5001 connected with 120.110.10.84 port
   34471
[ ID] Interval       Transfer     Bandwidth
[  4]  0.0-10.1 sec   109 MBytes  90.6 Mbits/sec
```

16.11 NAT Sessions

1. Linux Netfilter tweaks for High traffic servers

2. 編輯 /etc/sysctl.conf，設定 NAT 連接的最大 sessions 數 65536，保持連線時間 600 秒，已建立的 tcp 連線的超時時間爲 1275 秒。

```
[root@e517nat ~]# vim /etc/sysctl.conf
....
net.netfilter.nf_conntrack_max=65536
net.netfilter.nf_conntrack_tcp_timeout_established=1275
net.ipv4.tcp_keepalive_time=600
....
```

3. 將設定好的參數寫入系統。

```
[root@e517nat ~]# sysctl -p
net.ipv4.ip_forward = 1
net.netfilter.nf_conntrack_max = 65536
net.netfilter.nf_conntrack_tcp_timeout_established = 1275
net.ipv4.tcp_keepalive_time = 600
net.ipv4.conf.default.rp_filter = 1
net.ipv4.conf.default.accept_source_route = 0
kernel.sysrq = 0
kernel.core_uses_pid = 1
net.ipv4.tcp_syncookies = 1
```

4. 查看在系統中的參數。

```
[root@e517nat ~]# cat /proc/sys/net/netfilter/nf_conntrack_max
65536
[root@e517nat ~]# cat /proc/sys/net/netfilter/
   nf_conntrack_tcp_timeout_established
1275
```

Chapter 17

NAT LiveCD 製作實例

17.1 檔案收集

1. 下載 NAT iso 光碟檔。

```
[root@dywH ~]# cd /usr/src
[root@dywH src]# wget --content-disposition \
http://dywang.csie.cyut.edu.tw/moodle23/pluginfile.php/1/blog/attachment
    /335/nat20140312.iso
```

2. 不燒光碟，直接掛載 iso 檔。

```
[root@dywH src]# mkdir natiso
[root@dywH src]# mount -o loop nat20140312.iso natiso
[root@dywH src]# ls natiso/
add  CentOS_BuildTag  EULA  images    Packages                  repodata
bin  EFI              GPL   isolinux  RELEASE-NOTES-en-US.html  TRANS.
    TBL
```

3. 因爲掛載的光碟只能讀不能寫，所以必須複製到新目錄，才能進行修改。

```
[root@dywH src]# cp -a natiso nat
[root@dywH src]# ls nat
add  CentOS_BuildTag  EULA  images    Packages                  repodata
bin  EFI              GPL   isolinux  RELEASE-NOTES-en-US.html  TRANS.
    TBL
```

4. 自動安裝設定檔及套件檔更名

```
[root@dywH src]# cd nat/add
[root@dywH add]# cp nat-ks.cfg natlivecd-ks.cfg
```

17.2 NAT LiveCD kickstart 命令階段

1. 網路先設定，讓試安裝順利進行。livecd 開機時會有設定腳本，互動式設定對外網路。

```
[root@dywH add]# vim natlivecd-ks.cfg
network --device eth0 --bootproto=static --ip=192.168.1.254 --netmask
    =255.255.255.0 --hostname=natlivecd
network --device eth1 --bootproto=static --ip=10.10.1.254 --netmask
    =255.255.255.0
```

2. root 密碼先設定，讓試安裝順利進行。

```
[root@dywH add]# vim natlivecd-ks.cfg
rootpw  123123
```

3. LiveCD 試安裝時，工作系統及目錄爲您現在系統，可以直接指定系統中的套件資料庫，務必確認指定的來源有安裝套件資料庫可存取。

```
[root@dywH add]# vim natlivecd-ks.cfg
repo --name="DE-YU WANG" --baseurl=file:///usr/src/nat/
```

17.3 NAT LiveCD kickstart 安裝套件階段

1. 安裝套件列表，可以直接寫在 %packages 中，也可以使用 %include 包含進來。

```
[root@dywH add]# vim natlivecd-ks.cfg
%packages --nobase
%include /usr/src/nat/add/natpack
%end
```

2. LiveCD 需要使用 mtools 及 syslinux 套件，在精簡的 NAT ISO 中並不存在，必須先下載。

```
[root@dywH add]# wget http://dywang.csie.cyut.edu.tw/centos6/Packages/
    mtools-4.0.12-1.el6.x86_64.rpm \
-P /usr/src/nat/Packages/
[root@dywH add]# wget http://dywang.csie.cyut.edu.tw/centos6/Packages/
    yslinux-4.02-8.el6.x86_64.rpm \
-P /usr/src/nat/Packages/
```

3. 重新建立 repo 資料庫清單。

```
[root@dywH add]#  createrepo -g /usr/src/nat/repodata/comps.xml \
--update /usr/src/nat
```

4. nat 最小安裝套件列表 natpack 檔下載。

17.4 NAT LiveCD kickstart 預處理階段

1. LiveCD 無任何預處理。

```
[root@dywH add]# vim natlivecd-ks.cfg
%pre --log=/tmp/kspre
%end
```

17.5 NAT LiveCD kickstart 後處理階段

1. LiveCD 後處理時，環境變數 PATH 不存在，故先匯出環境變數，否則必須以絕對路徑執行命令。

```
[root@dywH add]# vim natlivecd-ks.cfg
%post --log=/kspost
export PATH="/usr/bin:/bin:/sbin:/usr/sbin:/var/ftp/pub/centos6/bin:"
%end
```

2. NAT 必須啓動 ip forward，才能讓內部 ip 連上 internet。

```
[root@dywH add]# vim natlivecd-ks.cfg
%post --log=/kspost
sed -i 's/\(^net.ipv4.ip_forward =\).*$/\1 1/g' /etc/sysctl.conf
%end
```

3. 因爲 LiveCD 不是固定安裝在某一台機器上，若 /etc/udev/rules.d/70-persistent-net.rules 中紀錄網卡 MAC 位址，會造成網卡啓動失敗，故必須刪除網卡 MAC 位址紀錄檔，且將其連結至 /dev/null，讓其無法產生。

```
%post --log=/kspost
ln -sf /dev/null /etc/udev/rules.d/70-persistent-net.rules
%end
```

4. NAT 中 dhcp 必須提供 dns，若內部不需要，也必須架設，單純爲內部 ip 查詢 doamin name 進行 forward。

```
[root@dywH add]# vim natlivecd-ks.cfg
%post --log=/kspost
cat > /etc/named.conf << END
// named.conf for NAT
//
// Provided by Red Hat bind package to configure the ISC BIND named(8) DNS
// server as a caching only nameserver (as a localhost DNS resolver only).
//
// See /usr/share/doc/bind*/sample/ for example named configuration files.
//

options {
    listen-on port 53 { any; };
    listen-on-v6 port 53 { ::1; };
    directory   "/var/named";
    dump-file   "/var/named/data/cache_dump.db";
    statistics-file "/var/named/data/named_stats.txt";
    memstatistics-file "/var/named/data/named_mem_stats.txt";
    allow-query     { any; };
    recursion yes;

    dnssec-enable yes;
    dnssec-validation yes;
    dnssec-lookaside auto;

    /* Path to ISC DLV key */
    bindkeys-file "/etc/named.iscdlv.key";
```

```
    forward only;
    forwarders {
        163.17.3.1;
        168.95.1.1;
        139.175.10.20;
    };
};
END
%end
```

5. 設定 DHCP 參數。

```
[root@dywH add]# vim natlivecd-ks.cfg
%post --log=/kspost
cat > /etc/dhcp/dhcpd.conf << END
#
# DHCP Server Configuration file.
#   see /usr/share/doc/dhcp*/dhcpd.conf.sample
#   see 'man 5 dhcpd.conf'
#
authoritative;
ddns-update-style none;

subnet 192.168.1.0 netmask 255.255.255.0 {
#   The following lines are standard all of the time.
    option routers 192.168.1.254;
    option subnet-mask 255.255.255.0;
    option domain-name "deyu.wang";
    option domain-name-servers 192.168.1.254,163.17.3.1,168.95.1.1;
    default-lease-time 600;
    max-lease-time 720;
    range 192.168.1.100 192.168.1.199;
    next-server 192.168.1.254;
}
END
%end
```

6. NAT 必須啓動 ip forward，才能讓內部 ip 連上 internet。

```
[root@dywH add]# vim natlivecd-ks.cfg
%post --log=/kspost
sed -i 's/\(^net.ipv4.ip_forward =\).*$/\1 1/g' /etc/sysctl.conf
%end
```

7. 修改 /etc/init/tty.conf，讓 LiveCD 開機自動以 root 身份登入。

```
[root@dywH add]# vim natlivecd-ks.cfg
%post --log=/kspost
sed -i 's/\(exec \/sbin\/mingetty \$TTY\).*/\1 --autologin root \$TTY/'
    /etc/init/tty.conf
%end
```

8. 在 root 家目錄中的 .bash_profile 加入 natboot.sh，讓系統以 root 身分登入後，自動執行網路設定腳本。

```
[root@dywH add]# vim natlivecd-ks.cfg
%post --log=/kspost
echo 'natboot.sh' >> /root/.bash_profile
%end
```

9. natlivecd-ks.cfg 設定檔下載。

17.6 NAT LiveCD kickstart 後處理 nochroot 階段

1. 利用 nochroot 將網路及防火牆設定腳本，複製到新的系統中。

```
[root@dywH add]# vim natlivecd-ks.cfg
%post --nochroot --log=$INSTALL_ROOT/tmp/ksnochrootpost
cp /usr/src/nat/bin/*.sh $INSTALL_ROOT/usr/local/bin/
%end
```

17.7 開機互動式設定腳本

1. 變更 root 及用户 csielabnat 密碼。

```
[root@dywH ~]# cd /usr/src/nat/bin
[root@dywH bin]# vim natboot.sh
passwd
passwd csielabnat
```

2. 要求使用者輸入對外網路 ip, 遮罩。

```
[root@dywH bin]# vim natboot.sh
ethdhcp='eth0'  ## Internal Network
ethint='eth1'   ## External Network
answer="n"
echo -n "SETUP EXTERNAL NETWORK: "
while [ x"$answer" != "xy" ] && [ x"$answer" != "xY" ] ; do
    echo -n "enter ip: "; read ip
    echo -n "enter netmask (255.255.255.0): "; read netmask
    [ "$netmask" == "" ] && netmask='255.255.255.0'
    echo -n "enter default gw: "; read gw
    echo

    echo You entered:
    echo -e "\tip: $ip"
    echo -e "\tnetmask: $netmask"
    echo -e "\tdefault gw: $gw"
    echo -n "Is this correct? [y/n] "; read answer
done
```

3. 將使用者輸入的資料，寫入對外網卡設定檔。

```
[root@dywH bin]# vim natboot.sh

cat > /etc/sysconfig/network-scripts/ifcfg-eth1 << END
DEVICE='eth1'
BOOTPROTO='static'
NM_CONTROLLED=no
ONBOOT=yes
IPADDR=$ip
NETMASK=$netmask
GATEWAY=$gw
DNS1=163.17.3.1
DNS2=163.17.1.1
END
```

4. 重新啓動網路。

```
/etc/init.d/network restart
```

5. 讓使用者輸入需要的防火牆設定，選項 --set= 後接 open 爲全開放、close 爲全關閉、csie 爲只開放連上校內網路、dywang 爲只能連上 De-Yu Wang 指定的網站。若此參數不輸入，預設爲全開放。myip 可以單獨指定某 ip 完全放行，不受防火牆管制。

```
[root@dywH bin]# vim natboot.sh
answer="n"
echo -n "SETUP IPTABLES: "
while [ x"$answer" != "xy" ] && [ x"$answer" != "xY" ] ; do
    echo -n "enter myip: "; read ip
    myip="192.168.1.$ip"
    echo -n "enter --set=[open|close|csie|dywang]: "; read iptab
    [ "$iptab" == "" ] && iptab='' || iptab="--set=${iptab}"
    echo

    echo You entered:
    echo -e "\tmyip: $myip"
    echo -e "\tiptables : $iptab"
    echo -n "Is this correct? [y/n] "; read answer
done
```

6. 重新建立 repo 資料庫清單。

```
[root@dywH bin]# vim natboot.sh
setdhcpiptables.sh $iptab --myip=$myip

exit 0
%post --nochroot --log=$INSTALL_ROOT/tmp/ksnochrootpost
cp /usr/src/nat/bin/*.sh $INSTALL_ROOT/usr/local/bin/
%end
```

17.8 建立 NAT LiveCD ISO 檔

1. livecd-creator 指令，選項 --config 指定安裝 kickstart 檔，--fslabel 指定產生的 ISO 檔名，不指定則與 kickstart 檔同名，--tmpdir= 可以指定試安裝暫存目錄，不指定則預設爲 /var/tmp，特別注意：此目錄一定要比足夠大安裝你的系統。

2. 產生 NAT LiveCD ISO 檔。

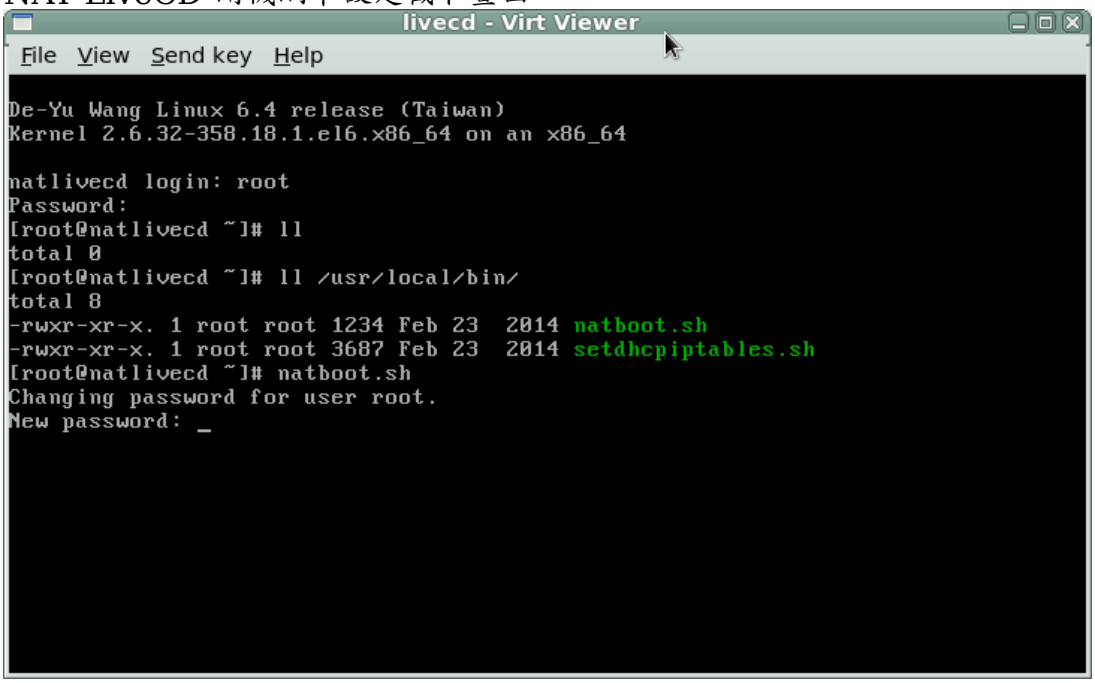
```
[root@dywH add]# cd /usr/src
[root@dywH src]# livecd-creator --config=/usr/src/nat/add/natlivecd-ks.
    cfg \
--fslabel=natlivecd`date +%Y%m%d`
[root@dywH src]# ll natlivecd20140223.iso
-rw-r--r--. 1 qemu qemu 260046848 Feb 23 16:01 natlivecd20140223.iso
```

3. 可以先用虛擬機開機測試，避免光碟燒錄的浪費。

```
[root@dywH ~]# virsh destroy livecd
[root@dywH ~]# virsh undefine --snapshots-metadata --managed-save livecd
[root@dywH ~]# virt-install --accelerate --name livecd --ram 1024 --
    nodisk \
--livecd --cdrom=/usr/src/natlivecd`date +%Y%m%d`.iso
```

4. NAT LiveCD ISO 檔下載。

5. NAT LiveCD 開機網卡設定截取畫面。



Part V

CentOS 6 -> DYW

Chapter 18

客製化 RPM 套件

18.1 RPM 與 SRPM 套件

1. 何謂 RPM？

   (a) RPM 全名是『RedHat Package Manager』簡稱爲 RPM。

   (b) 由 Red Hat 公司發展出來，由於 RPM 使用方便，所以成了目前最熱門的套件管理程式。

   (c) RPM 是以資料庫記錄的方式來將所需要的套件安裝到 Linux 主機的一套管理程式。

   (d) RPM 將要安裝的套件先編譯過，並且打包好，安裝時 RPM 會先依照套件裡的紀錄資料查詢相依屬性套件是否滿足，若滿足則予以安裝，若不滿足則不予安裝。

2. RPM 優點：

   (a) 免編譯：已編譯；

   (b) 避免安裝錯誤：安裝前先檢查系統的硬碟容量、作業系統版本等；

   (c) 瞭解套件：提供套件版本資訊、相依屬性套件名稱、套件用途說明、套件所含檔案等資訊；

   (d) 安裝、移除、更新升級及驗證套件方便：資料庫記錄參數，且一個指令即可完成。

   (e) 容易傳送：打包成一個檔案。

3. RPM 缺點：

   (a) 安裝的環境必須與打包時的環境需求一致或相當；

(b) 相依套件必須滿足；

(c) 反安裝時，下層套件不可先移除，否則可能造成整個系統的問題。

4. RPM 套件的屬性相依

(a) RPM 打包套件檔案時，會同時加入套件的訊息。例如：

i. 版本、

ii. 打包套件者、

iii. 相依屬性的套件、

iv. 套件的功能說明、

v. 套件的所有檔案與目錄紀錄。

(b) 在 Linux 系統上亦建立一個 RPM 套件資料庫。

(c) 當要安裝某個以 RPM 型態提供的套件時，如果資料庫顯示其相依套件不存在，則會顯示錯誤訊息。

(d) 屬性相依的克服方式

i. 手動下載並安裝好所有相依套件。

ii. 利用 urpmi 安裝 rpm 套件：自行尋找未安裝的相依套件加以安裝。

5. 何謂 SRPM？

(a) SRPM 是 Source RPM，也就是 RPM 檔案裡含有原始碼 (Source Code)。

(b) SRPM 除含 tarball 原始碼外，亦包含 rpm 規格檔.spec，提供重建 rpm 套件所有資訊。例如：所須相依性套件。

(c) SRPM 可經由修改規格檔，以重建符合自己系統之 rpm 套件。

6. SRPM 安裝與利用：

(a) 先將該套件以 RPM 管理的方式安裝；

(b) 安裝完成後，會有原始碼 tarball 及 rpm 規格檔.spec；

(c) 修改、重新編譯原始碼，再打包成 tarball；

(d) 修改 rpm 規格檔，以適合自己的 Linux 環境；

(e) 重建 RPM 套件；

(f) 以 RPM 管理方式，將重建之 RPM 套件安裝至系統；

7. RPM 與 SRPM 的格式：

```
name-version-release.architecture.rpm    <== RPM 檔名格式
name-version-release.src.rpm             <== SRPM 檔名格式
```

(a) 例如檔案 kplayer-0.5.3-5mdv2007.0.i586.rpm 的意義爲：

```
kplayer -   0.5.3     - 5mdv2007.0  .   i586     .  rpm
套件名稱   套件的版本資訊    釋出的次數    適合的硬體平台  附檔名
```

(b) 釋出版本次數：5mdv2007.0。

i. 不同的 distirbution 會有不同的環境與函式庫，釋出版本次數後可能會再加上 distirbution 的簡寫。

ii. mdv2007.0 表示 Linux distribution Mandriva 2007.0。

iii. 安裝 RPM 套件，最好選擇相同環境之檔案，即 distirbution 的簡寫與自己的系統環境相同。

(c) 操作硬體平台之選擇：

i. 平台名稱說明：

平台名稱	適合平台說明
i386	幾乎適用於所有的 x86 平台。 i 是 Intel 相容的 CPU，386 是 CPU 的等級。
i586	586 等級的電腦，包括 pentum 第一代 MMX CPU， AMD 的 K5, K6 系列等 CPU。
i686	pentum II 以後的 Intel 系列 CPU， 及 K7 以後等級的 CPU。
noarch	沒有任何硬體等級上的限制。
athlon	AMD Athlon 晶片。

ii. i386 可安裝在 586 或 686 的機器；

iii. i686 是針對 686 等級的 CPU 進行最佳化編譯，所以不一定可以使用於 386 或 586 的硬體。

iv. 在 686 的機器上使用 i686 的檔案會比使用 i386 的檔案，效能可能比較好。

v. 目前 Linux distribution Mandriva 2007.0 釋出之 rpm，平台名稱爲 i586。

8. RPM 檔案系統

(a) Mandriva 2007 以 /usr/src/rpm/ 爲工作目錄

(b) /usr/src/rpm 以下五個目錄：

rpm 子目錄	說明
BUILD	編譯過程中，暫存資料放置目錄。
RPMS	編譯打包成功後，完成的 rpm 檔案放置目錄。
SOURCES	放置套件的原始碼，即 tarball 檔。
SPECS	放置套件的規格檔 spec 檔案。
SRPMS	編譯打包成功後，完成的 srpm 檔案放置目錄。

(c) /usr/src/rpm/RPMS 目錄通常有一些架構的子目錄，如下：

```
$ ls RPMS
athlon
i386
i486
i586
i686
noarch
```

18.2 建立工作環境

1. 安裝工作套件

```
[root@dywH ~]# yum install rpm-build -y
```

2. 大部份以 CentOS 作爲重建目標的 SRPM 亦需要特定的 rpmbuild 建立巨集及輔助腳本，這些都收錄在 redhat-rpm-config 套件內。如果沒安裝此套件，重建的 RPM 檔檔案大小會變大。

```
[root@dyH ~]# yum install redhat-rpm-config
```

3. 增加工作帳號

```
[root@dyH ~]# useradd -s /sbin/nologin mockbuild
```

4. 千萬不要使用 root 的身份來建立 RPM。建立 RPM 檔一定要以沒有特殊權限的用户進行，以 root 身份來建立 RPM 不但可能會損壞系統，且建立的檔案也比較大。

```
[root@dywH ~]# su - dywang
[dywang@dywH ~]$
```

5. 建立工作目錄

```
[dywang@dywH ~]$ mkdir -p ~/rpmbuild/{RPMS,SOURCES,SPECS,SRPMS}
[dywang@dywH ~]$ mkdir -p ~/rpmbuild/RPMS/{noarch,x86_64}
```

6. 建立用户個人巨集設定

```
[dywang@dywH ~]$ echo '%_topdir %(echo $HOME)/rpmbuild' >> ~/.rpmmacros
```

7. 如果不要建立 debuginfo package，可以在巨集設定中取消，但是沒有將 debuginfo 分離，RPM 套件檔案會比較大。

```
[dywang@dywH ~]$ echo '%debug_package %{nil}' >> ~/.rpmmacros
```

8. 如果巨集設定沒作用，請安裝 redhat-rpm-config 套件，其可設定全域變數，其中 _enable_debug_packages 1 啓動 debug package。

```
[root@dyw219 ~]# yum install redhat-rpm-config
[root@dyw219 ~]# grep debug_package /usr/lib/rpm/redhat/macros
%_enable_debug_packages 1
    %{!?__debug_package:/usr/lib/rpm/redhat/brp-strip %{__strip}} \
    %{?__debug_package:%{__debug_install_post}}\
%debug_package \
%global __debug_package 1\
%install %{?_enable_debug_packages:%{?buildsubdir:%{debug_package}}}\
```

18.3 centos-release 套件實例

1. 下載 SRPM 套件

```
[dywang@dywH ~]$ cd rpmbuild/
[dywang@dywH rpmbuild]$ wget http://dywang.csie.cyut.edu.tw/moodle23/
   dywang/download/centos-release-6-4.el6.10.dyw.src.rpm
```

2. 安裝 SRPM 套件

```
[dywang@dywH rpmbuild]$ rpm -ivh centos-release-6-4.el6.10.dyw.src.rpm
   1:centos-release         ##########################################
      [100%]
```

3. 解打包壓縮

```
[dywang@dywH rpmbuild]$ cd SOURCES/
[dywang@dywH SOURCES]$ tar zxvf centos-release-6-4.tar.gz
centos-release-6/CentOS-Base.repo
centos-release-6/CentOS-Debuginfo.repo
centos-release-6/CentOS-Media.repo
centos-release-6/CentOS-Vault.repo
centos-release-6/EULA
centos-release-6/GPL
centos-release-6/RPM-GPG-KEY-CentOS-6
centos-release-6/RPM-GPG-KEY-CentOS-Debug-6
centos-release-6/RPM-GPG-KEY-CentOS-Security-6
centos-release-6/RPM-GPG-KEY-CentOS-Testing-6
```

4. 修改 initscript 規格檔，此規格檔已修改過，可依自己的需求再修改，在 install 段落加入自己的 repo server，由於三個 repo server 內容都一樣，目的只在於若本地端存在，就不需要透過遠端 server 下載套件，以加快速度，其 skip_if_unavailable=1 是設定 repo server 無法連線就跳過，否則只要有一 server 無法連線就不能安裝。priority=n 則是指定 repo server 的優先順序，n 可以從 1 到 99，數字越小越優先，不過要安裝 yum-plugin-priorities 套件才能生效，所以增加相依套件要求 Requires: yum-plugin-priorities。

```
[dywang@dywH SOURCES]$ vim ../SPECS/centos-release.spec
Requires:   yum-plugin-priorities
........
Release:        4%{?dist}.10.dyw
........
%install
........

# create /etc/system-release and /etc/dywang-release
```

```
10 echo "De-Yu Wang Linux %{full_release_version} release (Taiwan)" >
       $RPM_BUILD_ROOT/etc/dywang-release
   ln -s dywang-release $RPM_BUILD_ROOT/etc/centos-release
12 ln -s dywang-release $RPM_BUILD_ROOT/etc/system-release
   # write cpe to /etc/system/release-cpe
14 echo "cpe:/o:centos:linux:%{version}:%{?beta:%{beta}}%{!?beta:GA}" >
       $RPM_BUILD_ROOT/etc/system-release-cpe

16 # create /etc/issue and /etc/issue.net
   cp $RPM_BUILD_ROOT/etc/dywang-release $RPM_BUILD_ROOT/etc/issue
18 echo "Kernel \r on an \m" >> $RPM_BUILD_ROOT/etc/issue
   cp $RPM_BUILD_ROOT/etc/issue $RPM_BUILD_ROOT/etc/issue.net
20 echo >> $RPM_BUILD_ROOT/etc/issue

22 # copy yum repos to /etc/yum.repos.d
   mkdir -p $RPM_BUILD_ROOT/etc/yum.repos.d/repotmp
24 for file in *.repo; do
       install -m 644 $file $RPM_BUILD_ROOT/etc/yum.repos.d/repotmp
26 done
   # create dywang repo
28 cat > $RPM_BUILD_ROOT/etc/yum.repos.d/dywang.repo << EOF
   [dywlocal]
30 name=De-Yu Wang Local
   baseurl=ftp://deyu.wang/pub/centos6/
32 gpgcheck=0
   priority=1
34 skip_if_unavailable=1
   [dywpxe]
36 name=De-Yu Wang PXE
   baseurl=ftp://192.168.1.254/pub/centos6/
38 gpgcheck=0
   priority=20
40 skip_if_unavailable=1
   [dywang]
42 name=De-Yu Wang
   baseurl=http://dywang.csie.cyut.edu.tw/centos6/
44 gpgcheck=0
   priority=30
46 skip_if_unavailable=1
   EOF
```

5. 重建 centos-release RPM 及 SRPM 二進位檔

```
1 [dywang@dywH SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
      SPECS/centos-release.spec
```

6. 查看新產生的 centos-release RPM 及 SRPM 二進位檔

```
1 [dywang@dywH SOURCES]$ ll ../RPMS/x86_64/centos* ../SRPMS/centos*
```

```
-rw-r--r--. 1 dywang dywang 19667 Jan 28 10:57 ../RPMS/x86_64/centos-
    release-6-4.el6.10.dyw.x86_64.rpm
-rw-r--r--. 1 dywang dywang 18044 Jan 28 10:57 ../SRPMS/centos-release
    -6-4.el6.10.dyw.src.rpm
```

18.4 redhat-logos 套件實例

1. 下載 SRPM 套件

```
[dywang@dywmac ~]$ cd rpmbuild/
[dywang@dywmac rpmbuild]$ wget ftp://ftp.pbone.net/mirror/vault.centos.
    org/6.1\
/os/SRPMS/Packages/redhat-logos-60.0.14-10.el6.src.rpm
```

2. 安裝 SRPM 套件

```
[dywang@dywmac rpmbuild]$ rpm -ivh redhat-logos-60.0.14-10.el6.src.rpm
   1:redhat-logos           ########################################
      [100%]
```

3. 解打包壓縮

```
[dywang@dywmac rpmbuild]$ cd SOURCES/
[dywang@dywmac SOURCES]$ tar jxvf redhat-logos-60.0.14.tar.bz2
redhat-logos-60.0.14/
redhat-logos-60.0.14/gnome-screensaver/
.................
```

4. 將 faenza-icon-theme 套件中的 icon gksu-root-terminal.png 複製到 redhat-logos 套件解打包的原始碼 icons 目錄中。

```
[dywang@dywmac SOURCES]$ cp /usr/share/icons/Faenza/apps/48/gksu-root-
    terminal.png \
redhat-logos-60.0.14/icons/hicolor/48x48/apps/root-terminal.png
```

5. 將客製化的背景圖複製到 backgrounds 目錄中並移除原來預設的圖檔 default*.png。

```
[dywang@dywmac SOURCES]$ rm redhat-logos-60.0.14/backgrounds/*.png
[dywang@dywmac SOURCES]$ cp /usr/share/backgrounds/dywang6_1280x1024.jpg
    redhat-logos-60.0.14/backgrounds/
[dywang@dywmac SOURCES]$ ll redhat-logos-60.0.14/backgrounds/total 1440
-rw-r--r--. 1 dywang dywang    473 Sep 29 14:18 default.xml
-rw-r--r--. 1 dywang dywang    312 Nov 19  2010 desktop-backgrounds-
   default.xml
-rw-r--r--. 1 dywang dywang 529176 Sep 29 14:19 dywang6_1280x1024.jpg
-rw-r--r--. 1 dywang dywang 931957 Jan 26  2011 simple_waves.jpg
```

6. 移除 kde 相關的圖檔。

```
[dywang@dywmac rpmbuild]$ cd SOURCES/
[dywang@dywmac SOURCES]$ cd redhat-logos-60.0.14
[dywang@dywmac redhat-logos-60.0.14]$ rm -rf kde-splash
```

7. 將客製化的開機背景圖複製到相對的目錄中。

```
[dywang@dywmac redhat-logos-60.0.14]$ cp /boot/grub/splash.xpm.gz
   bootloader/
[dywang@dywmac redhat-logos-60.0.14]$ cp /usr/share/anaconda/pixmaps/
   splash.png anaconda/
[dywang@dywmac redhat-logos-60.0.14]$ cp /usr/share/firstboot/themes/
   RHEL/splash-small.png firstboot/
[dywang@dywmac redhat-logos-60.0.14]$ cp /usr/lib/anaconda-runtime/s*
   anaconda/
[dywang@dywmac customlinux]$ cd ~/rpmbuild/SOURCES/redhat-logos-60.0.14
[dywang@dywmac redhat-logos-60.0.14]$ cp /usr/lib/anaconda-runtime/boot/
   syslinux-splash.png anaconda/
[dywang@dywmac redhat-logos-60.0.14]$ cp /usr/share/anaconda/pixmaps/
   anaconda_header.png anaconda/
[dywang@dywmac redhat-logos-60.0.14]$ cp /usr/share/anaconda/pixmaps/
   syslinux-splash.png anaconda/
[dywang@dywmac redhat-logos-60.0.14]$ cp /usr/share/backgrounds/desktop-
   backgrounds-default.xml backgrounds/
[dywang@dywmac redhat-logos-60.0.14]$ cp /usr/share/firstboot/themes/
   RHEL/firstboot-* firstboot/
[dywang@dywmac redhat-logos-60.0.14]$ cp /usr/share/firstboot/themes/
   RHEL/workstation.png firstboot/
[dywang@dywmac redhat-logos-60.0.14]$ cp /usr/share/plymouth/themes/
   rings/header-image.png plymouth/rings/
```

8. 重新打包壓縮 redhat-logos-60.0.14.tar.bz2。

```
[dywang@dywmac redhat-logos-60.0.14]$ cd ..
```

```
[dywang@dywmac SOURCES]$ tar jcvf redhat-logos-60.0.14.tar.bz2 redhat-
    logos-60.0.14
```

9. 修改 initscript 規格檔，增加 dyw 次版本標示。因預設使用 gnome 且不打算使用 kde，所以取消 kde 相關檔案的安裝，爲節省檔案大小，預設背景圖檔以連結方式處理。

```
[dywang@dywmac redhat-logos-60.0.14]$ cd ../../SPECS
[dywang@dywmac SPECS]$ cp redhat-logos.spec redhat-logos.spec.orig
[dywang@dywmac SPECS]$ vim redhat-logos.spec
[dywang@dywmac SPECS]$ diff -uN redhat-logos.spec.orig redhat-logos.spec
--- redhat-logos.spec.orig  2017-09-29 14:23:01.545441145 +0800
+++ redhat-logos.spec   2017-09-29 14:52:22.048798871 +0800
@@ -4,7 +4,7 @@
 Name: redhat-logos
 Summary: CentOS-related icons and pictures
 Version: 60.0.14
-Release: 10%{?dist}
+Release: 10%{?dist}.dyw
 Group: System Environment/Base
 # No upstream, do in dist-cvs
 Source0: redhat-logos-%{version}.tar.bz2
@@ -19,8 +19,6 @@
 Provides: desktop-backgrounds-basic = %{version}-%{release}
 Conflicts: redhat-artwork <= 5.0.5
 Requires(post): coreutils
-# For _kde4_appsdir macro:
-BuildRequires: kde-filesystem

 %description
 The redhat-logos package (the "Package") contains files created by the
@@ -51,7 +49,7 @@
 done

 mkdir -p $RPM_BUILD_ROOT%{_datadir}/backgrounds/
-for i in backgrounds/*.png backgrounds/*.jpg backgrounds/default.xml;
    do
+for i in backgrounds/*.jpg backgrounds/default.xml; do
   install -p -m 644 $i $RPM_BUILD_ROOT%{_datadir}/backgrounds/
 done

@@ -92,36 +90,14 @@
 for i in 16 24 32 36 48 96; do
   mkdir -p $RPM_BUILD_ROOT%{_datadir}/icons/System/${i}x${i}/places
   install -p -m 644 -D $RPM_BUILD_ROOT%{_datadir}/icons/hicolor/${i}x${
       i}/apps/system-logo-icon.png $RPM_BUILD_ROOT%{_datadir}/icons/
       System/${i}x${i}/places/start-here.png
-  install -p -m 644 -D $RPM_BUILD_ROOT%{_datadir}/icons/hicolor/${i}x${
    i}/apps/system-logo-icon.png $RPM_BUILD_ROOT%{_datadir}/kde-settings
    /kde-profile/default/share/icons/Fedora-KDE/${i}x${i}/places/start-
    here.png
```

```
 done
40
-# ksplash theme
42 -mkdir -p $RPM_BUILD_ROOT%{_kde4_appsdir}/ksplash/Themes/
-cp -rp kde-splash/CentOS6/ $RPM_BUILD_ROOT%{_kde4_appsdir}/ksplash/
    Themes/
44 -pushd $RPM_BUILD_ROOT%{_kde4_appsdir}/ksplash/Themes/CentOS6/1920x1200/
-ln -s %{_datadir}/anaconda/pixmaps/splash.png splash.png
46 -ln -s %{_datadir}/backgrounds/default.png background.png
-popd
48 -
-# kdm theme
50 -mkdir -p $RPM_BUILD_ROOT/%{_kde4_appsdir}/kdm/themes/
-cp -rp kde-kdm/CentOS6/ $RPM_BUILD_ROOT/%{_kde4_appsdir}/kdm/themes/
52 -pushd $RPM_BUILD_ROOT/%{_kde4_appsdir}/kdm/themes/CentOS6/
-ln -s %{_datadir}/backgrounds/default.png background.png
54 -ln -s %{_datadir}/pixmaps/system-logo-white.png system-logo-white.png
-popd
56 -
-# wallpaper theme
58 -mkdir -p $RPM_BUILD_ROOT/%{_datadir}/wallpapers/
-cp -rp kde-plasma/CentOS6/ $RPM_BUILD_ROOT/%{_datadir}/wallpapers
60 -
 %clean
62 rm -rf $RPM_BUILD_ROOT

64 %post
 touch --no-create %{_datadir}/icons/hicolor || :
66 touch --no-create %{_datadir}/icons/System || :
-touch --no-create %{_datadir}/kde-settings/kde-profile/default/share/
    icons/Fedora-KDE ||:
68 if [ -x /usr/bin/gtk-update-icon-cache ]; then
   if [ -f %{_datadir}/icons/hicolor/index.theme ]; then
70   gtk-update-icon-cache %{_datadir}/icons/hicolor &> /dev/null || :
@@ -131,6 +107,11 @@
72   fi
 fi
74
+cd %{_datadir}/backgrounds
76 +ln -sf dywang6_1280x1024.jpg default_1920x1200.png
+ln -sf dywang6_1280x1024.jpg default_1920x1440.png
78 +ln -sf dywang6_1280x1024.jpg default.png
+
80 %files
 %defattr(-, root, root, -)
82 %doc COPYING
@@ -139,7 +120,6 @@
84 %{_datadir}/gnome-background-properties/*
 %{_datadir}/firstboot/themes/RHEL/
86 %{_datadir}/plymouth/themes/rings/
-%{_datadir}/kde-settings/kde-profile/default/share/icons/Fedora-KDE/*/
    places/*
88 %{_datadir}/pixmaps/*
 %{_datadir}/anaconda/pixmaps/*
```

```
 %{_datadir}/icons/hicolor/*/apps/*
@@ -148,9 +128,6 @@
 %{anaconda_image_prefix}/boot/*png
 %{anaconda_image_prefix}/*.sh
 %{anaconda_image_prefix}/*.jpg
-%{_kde4_appsdir}/ksplash/Themes/CentOS6/
-%{_kde4_appsdir}/kdm/themes/CentOS6/
-%{_kde4_datadir}/wallpapers/CentOS6/

 # we multi-own these directories, so as not to require the packages
     that
 # provide them, thereby dragging in excess dependencies.
@@ -159,25 +136,6 @@
 %dir %{anaconda_image_prefix}/boot
 %dir %{_datadir}/anaconda
 %dir %{_datadir}/anaconda/pixmaps/
-%dir %{_datadir}/kde-settings
-%dir %{_datadir}/kde-settings/kde-profile
-%dir %{_datadir}/kde-settings/kde-profile/default
-%dir %{_datadir}/kde-settings/kde-profile/default/share
-%dir %{_datadir}/kde-settings/kde-profile/default/share/icons
-%dir %{_datadir}/kde-settings/kde-profile/default/share/icons/Fedora-
    KDE
-%dir %{_datadir}/kde-settings/kde-profile/default/share/icons/Fedora-
    KDE/16x16
-%dir %{_datadir}/kde-settings/kde-profile/default/share/icons/Fedora-
    KDE/16x16/places
-%dir %{_datadir}/kde-settings/kde-profile/default/share/icons/Fedora-
    KDE/24x24
-%dir %{_datadir}/kde-settings/kde-profile/default/share/icons/Fedora-
    KDE/24x24/places
-%dir %{_datadir}/kde-settings/kde-profile/default/share/icons/Fedora-
    KDE/32x32
-%dir %{_datadir}/kde-settings/kde-profile/default/share/icons/Fedora-
    KDE/32x32/places
-%dir %{_datadir}/kde-settings/kde-profile/default/share/icons/Fedora-
    KDE/36x36
-%dir %{_datadir}/kde-settings/kde-profile/default/share/icons/Fedora-
    KDE/36x36/places
-%dir %{_datadir}/kde-settings/kde-profile/default/share/icons/Fedora-
    KDE/48x48
-%dir %{_datadir}/kde-settings/kde-profile/default/share/icons/Fedora-
    KDE/48x48/places
-%dir %{_datadir}/kde-settings/kde-profile/default/share/icons/Fedora-
    KDE/96x96
-%dir %{_datadir}/kde-settings/kde-profile/default/share/icons/Fedora-
    KDE/96x96/places
-%dir %{_kde4_appsdir}
 # should be ifarch i386
 /boot/grub/splash.xpm.gz
 # end i386 bits
```

10. 重建 centos-release RPM 及 SRPM 二進位檔

```
[dywang@dywmac SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
    SPECS/redhat-logos.spec
```

11. 查看新產生的 redhat-logos RPM 及 SRPM 二進位檔

```
[dywang@dywmac SOURCES]$ ll ../RPMS/noarch/redhat-logos* ../SRPMS/redhat
    -logos*
-rw-rw-r--. 1 dywang dywang  2276332 Sep 29 16:26 ../RPMS/noarch/redhat-
    logos-60.0.14-10.el6.dyw.noarch.rpm
-rw-rw-r--. 1 dywang dywang  6772832 Sep 29 16:26 ../SRPMS/redhat-logos
    -60.0.14-10.el6.dyw.src.rpm
```

18.5 plymouth 套件實例

1. 下載 SRPM 套件

```
[dywang@dywH ~]$ cd rpmbuild/
[dywang@dywH rpmbuild]$ wget ftp://ftp.pbone.net/mirror/\
vault.centos.org/6.4/os/Source/SPackages/\
plymouth-0.8.3-27.el6.centos.src.rpm
```

2. 安裝 SRPM 套件

```
[dywang@dywH rpmbuild]$ rpm -ivh plymouth-0.8.3-27.el6.centos.src.rpm
   1:plymouth               ########################################
      [100%]
```

3. 解打包壓縮

```
[dywang@dywH rpmbuild]$ cd SOURCES/
[dywang@dywH SOURCES]$ tar jxvf plymouth-0.8.3.tar.bz2
```

4. 修改 plymouth 原始碼

```
[dywang@dywH SOURCES]$ vim plymouth-0.8.3/src/plugins/splash/text/plugin
    .c
```

```
ply_terminal_set_color_hex_value (terminal,PLY_TERMINAL_COLOR_BLACK,0
    x000000);
ply_terminal_set_color_hex_value (terminal,PLY_TERMINAL_COLOR_WHITE,0
    xffffff);
ply_terminal_set_color_hex_value (terminal,PLY_TERMINAL_COLOR_BLUE,0
    x85C7AD); // 0x0073B3);
ply_terminal_set_color_hex_value (terminal,PLY_TERMINAL_COLOR_BROWN,0
    x5B8B78); // 0x00457E);
```

5. 重新打包壓縮 plymouth 原始碼

```
[dywang@dywH SOURCES]$ tar jcvf plymouth-0.8.3.tar.bz2 plymouth-0.8.3
```

6. 修改 plymouth 規格檔

```
[dywang@dywH SOURCES]$ vim ../SPECS/plymouth.spec
[dywang@dywH SOURCES]$ grep dyw ../SPECS/plymouth.spec
Release: 27%{?dist}.dyw
```

7. 重建 plymouth RPM 及 SRPM 二進位檔

```
[dywang@dywH SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
    SPECS/plymouth.spec
Building target platforms: x86_64
Building for target x86_64
error: Failed build dependencies:
    libtool is needed by plymouth-0.8.3-27.el6.dyw.x86_64
```

8. 安裝相依套件

```
[dywang@dywH SOURCES]$ sudo yum install libtool
```

9. 再重建 plymouth RPM 及 SRPM 二進位檔

```
[dywang@dywH SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
    SPECS/plymouth.spec

[dywang@dywH SOURCES]$ ll ../RPMS/noarch/plymouth-* ../SRPMS/plymouth-*
-rw-r--r--. 1 dywang dywang   26329 Aug  1 07:32 ../RPMS/noarch/plymouth
    -system-theme-0.8.3-27.el6.dyw.noarch.rpm
```

```
-rw-r--r--. 1 dywang dywang   58632 Aug  1 07:32 ../RPMS/noarch/plymouth
    -theme-fade-in-0.8.3-27.el6.dyw.noarch.rpm
-rw-r--r--. 1 dywang dywang   31878 Aug  1 07:32 ../RPMS/noarch/plymouth
    -theme-rings-0.8.3-27.el6.dyw.noarch.rpm
-rw-r--r--. 1 dywang dywang   32824 Aug  1 07:32 ../RPMS/noarch/plymouth
    -theme-script-0.8.3-27.el6.dyw.noarch.rpm
-rw-r--r--. 1 dywang dywang  387329 Aug  1 07:32 ../RPMS/noarch/plymouth
    -theme-solar-0.8.3-27.el6.dyw.noarch.rpm
-rw-r--r--. 1 dywang dywang   45303 Aug  1 07:32 ../RPMS/noarch/plymouth
    -theme-spinfinity-0.8.3-27.el6.dyw.noarch.rpm
-rw-r--r--. 1 dywang dywang 1124632 Aug  1 07:32 ../SRPMS/plymouth
    -0.8.3-27.el6.dyw.src.rpm
```

18.6 initscripts 套件實例

1. 下載 SRPM 套件

```
[dywang@dywH ~]$ cd rpmbuild/
[dywang@dywH rpmbuild]$ wget ftp://ftp.icm.edu.pl/vol/rzm3/linux-ibiblio
    /distributions/\
smeserver/releases/testing/9.0alpha3/smeos/SRPMS/initscripts-9.03.38-1.
    el6.sme.src.rpm
```

2. 安裝 SRPM 套件

```
[dywang@dywH rpmbuild]$ rpm -ivh initscripts-9.03.38-1.el6.sme.src.rpm
warning: initscripts-9.03.38-1.el6.sme.src.rpm: Header V4 DSA/SHA1
    Signature, key ID 1e9c9308: NOKEY
   1:initscripts            ########################################
       [100%]
```

3. 解打包壓縮

```
[dywang@dywH rpmbuild]$ cd SOURCES/
[dywang@dywH SOURCES]$ tar jxvf initscripts-9.03.38.tar.bz2
```

4. 修改 initscript 原始碼

```
[dywang@dywH SOURCES]$ vim initscripts-9.03.38/rc.d/rc.sysinit
.........
if [[ "$system_release" =~ "De-Yu Wang" ]]; then
```

```
[ "$BOOTUP" = "color" ] && echo -en "\\033[0;36m"
 echo -en "De-Yu Wang"
 [ "$BOOTUP" = "color" ] && echo -en "\\033[0;39m"
 PRODUCT=$(sed "s/De-Yu Wang \(.*\) release.*/\1/" /etc/system-release)
 echo " $PRODUCT"
elif [[ "$system_release" == *"Red Hat"* ]]; then
 [ "$BOOTUP" = "color" ] && echo -en "\\033[0;31m"
 echo -en "Red Hat"
 [ "$BOOTUP" = "color" ] && echo -en "\\033[0;39m"
 PRODUCT=$(sed "s/Red Hat \(.*\) release.*/\1/" /etc/system-release)
 echo " $PRODUCT"
elif [[ "$system_release" == *Fedora* ]]; then
 [ "$BOOTUP" = "color" ] && echo -en "\\033[0;34m"
 echo -en "Fedora"
 [ "$BOOTUP" = "color" ] && echo -en "\\033[0;39m"
 PRODUCT=$(sed "s/Fedora \(.*\) \?release.*/\1/" /etc/system-release)
 echo " $PRODUCT"
else
 PRODUCT=$(sed "s/ release.*//g" /etc/system-release)
 echo "$PRODUCT"
fi
........
```

5. 重新打包壓縮 initscript 原始碼

```
[dywang@dywH SOURCES]$ tar jcvf initscripts-9.03.38.tar.bz2 initscripts
    -9.03.38
```

6. 修改 initscript 規格檔

```
[dywang@dywH SOURCES]$ vim ../SPECS/initscripts.spec
Release: 1%{?dist}.dyw
```

7. 重建 initscript RPM 及 SRPM 二進位檔

```
[dywang@dywH SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
    SPECS/initscripts.spec
Building target platforms: x86_64
Building for target x86_64
error: Failed build dependencies:
    popt-devel is needed by initscripts-9.03.38-1.el6.dyw.x86_64
```

8. 安裝相依套件

```
[dywang@dywH SOURCES]$ sudo yum install popt-devel
```

9. 再重建 initscript RPM 及 SRPM 二進位檔

```
[dywang@dywH SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
    SPECS/initscripts.spec

[dywang@dywH SOURCES]$ ll ../RPMS/x86_64/initscripts* ../SRPMS/
    initscripts*
-rw-r--r--. 1 dywang dywang 1831739 Aug  1 07:53 ../RPMS/x86_64/
    initscripts-9.03.38-1.el6.dyw.x86_64.rpm
-rw-r--r--. 1 dywang dywang 1611443 Aug  1 07:53 ../SRPMS/initscripts
    -9.03.38-1.el6.dyw.src.rpm
```

18.7 gcin-1.5.1 套件實例

1. gcin 套件不是 RHEL/CentOS 內建的輸入法，安裝後有 bug 無法使用，必須修改設定。與其安裝完再修改設定，不如直接修改 RPM 套件。gcin-2.7.1 在 glibc-2.12 環境、locale 使用 en_US.UTF-8 可以執行，但使用 zh_TW.UTF-8 中文桌面卻無法執行，會彈出"Unknown file type" 視窗。因此，還是使用 gcin-1.5.1，只是無法支援陸生習慣的輸入法。

2. 下載 SRPM 套件

```
[dywang@dywH ~]$ cd rpmbuild
[dywang@dywH rpmbuild]$ wget ftp://mirror.switch.ch/pool/1/mirror/epel/
    beta/6/SRPMS/gcin-1.5.1-1.el6.src.rpm
```

3. 安裝 SRPM 套件

```
[dywang@dywH rpmbuild]$ rpm -ivh gcin-1.5.1-1.el6.src.rpm
```

4. 至原始碼目錄中查看檔案。

```
[dywang@dywH rpmbuild]$ cd SOURCE
[dywang@dywH SOURCES]$ ll
total 4408
-rw-r--r--. 1 mockbuild mockbuild     748 May  5  2010 configure.patch
```

```
-rw-r--r--. 1 mockbuild mockbuild     709 Oct 21  2008 gcin-1.4.2-gtk-
    immodules-lang.patch
-rw-rw-r--. 1 mockbuild mockbuild 2827298 Jun 23  2010 gcin-1.5.1.tar.
    bz2
-rw-r--r--. 1 mockbuild mockbuild     179 Nov 24  2009 gcin.conf
-rw-r--r--. 1 mockbuild mockbuild     888 Jan  5  2010 gcin_gtab.patch
-rw-r--r--. 1 mockbuild mockbuild   20290 Sep  8  2006 gcinicon.tgz
-rw-r--r--. 1 mockbuild mockbuild    5833 Jul  8  2010 gtk-deprecated.
    patch
-rw-r--r--. 1 mockbuild mockbuild    5584 Jul  8  2010 im-client.patch
-rw-r--r--. 1 mockbuild mockbuild 1621854 Apr 17  2007 NewCJ3.cin
-rw-r--r--. 1 mockbuild mockbuild     533 Feb  4  2009 newcj3.patch
-rw-r--r--. 1 mockbuild mockbuild    1644 Jul  8  2010 qt.patch
```

5. 解壓縮原始碼 tarball，產生 gcin-1.5.1 目錄，存放原始碼。

```
[dywang@dywH SOURCES]$ tar jxvf gcin-1.5.1.tar.bz2
```

6. 至 gcin-1.5.1 目錄，修改原始碼。

```
[dywang@dywH SOURCES]$ cd gcin-1.5.1
[dywang@dywH gcin-1.5.1]$ ls
about.cpp              gtab.cpp            scripts
anthy.cpp              gtab-dbg.cpp        setup-rpm
a.txt                  gtab.h              sim2trad.cpp
..........
gcin-endian.h          juyin-learn.cpp     tslearn.cpp
gcin-exec-script.cpp   kbmcv.cpp           tutf8
gcin_filter            locale.cpp          tval
gcin-gb-toggle.cpp     Makefile            txim
gcin.h                 man                 unix-exec.cpp
gcin-icon.cpp          menu                util.cpp
gcin-kbm-toggle.cpp    mitem.h             VERSION.gcin
gcin-message.cpp       os-dep.h            win0.cpp
..........
```

7. 修改 gcin.spec 規格檔版本宣告，版本加入 dyw。

```
[dywang@dywH SOURCES]$ diff -uN ../tmp/gcin.spec ../SPECS/gcin.spec
--- ../tmp/gcin.spec    2010-07-08 16:49:35.000000000 +0800
+++ ../SPECS/gcin.spec  2015-09-07 07:07:32.505233444 +0800
@@ -1,6 +1,6 @@
 Name:           gcin
 Version:        1.5.1
-Release:        1%{?dist}
+Release:        1%{?dist}.dyw
```

```
Summary:        Input method for Traditional Chinese

Group:          System Environment/Libraries
```

8. 修改 gcin.spec 規格檔在章節%post gtk2 加入修改腳本，主要目的爲解決 gcin 非 RHEL/CentOS 預設輸入法造成的問題，修改檔案 redhat-linux-gnu 爲 unknown-linux-gnu，可以在不知系統版本下都使用 gcin。

```
@@ -76,6 +76,28 @@

 %post
 /sbin/ldconfig
+# For upgrades, the cache will be regenerated by the new package's %%postun
+mkdir /etc/gtk-2.0/%{_arch}-unknown-linux-gnu 2>/dev/null
+file="/etc/gtk-2.0/%{_arch}-unknown-linux-gnu/gtk.immodules"
+gtk-query-immodules-2.0-%{__isa_bits} > $file || :
+if ! grep -q "im-gcin.so" $file; then
+   echo "\"/usr/lib64/gtk-2.0/immodules/im-gcin.so\"" >> $file
+   echo "\"gcin\" \"gcin Input Method\" \"gcin\" \"/usr/share/locale\" \"*\"" >> $file
+fi
+
+gd="/etc/X11/xinit/xinput.d"
+cd $gd
+gf="/etc/X11/xinit/xinput.d/gcin.conf"
+ln -sf $gd/gcin.conf /etc/alternatives/xinputrc
+[ ! -e none.conf.orig  -a ! -L none.conf ] && mv none.conf none.conf.orig
+ln -sf gcin.conf none.conf
+sed -i 's/^\(XIM_ARGS=\"\).*$/\1LC_CTYPE=zh_TW.UTF-8 -x gcin\"/' $gf

+gtk-query-immodules-2.0-%{__isa_bits} --update-cache
 %{_bindir}/update-gtk-immodules %{_host} >/dev/null 2>&1 || :
 update-desktop-database %{_datadir}/applications >/dev/null 2>&1 || :
   %{_sbindir}/alternatives --install %{_sysconfdir}/X11/xinit/xinputrc \
xinputrc %{_sysconfdir}/X11/xinit/xinput.d/gcin.conf 40
```

9. gcin 設定程式預設字型過大，修改字型大小爲 11。

```
[dywang@dywH SOURCES]$ diff -uN ../tmp/gcin-1.5.1/gcin-settings.cpp gcin-1.5.1/gcin-settings.cpp
--- ../tmp/gcin-1.5.1/gcin-settings.cpp 2010-06-19 13:54:02.000000000 +0800
+++ gcin-1.5.1/gcin-settings.cpp    2015-09-07 08:59:30.875230520 +0800
@@ -63,17 +63,17 @@
```

```
 void load_setttings()
 {
-  gcin_font_size = get_gcin_conf_int(GCIN_FONT_SIZE, 16);
+  gcin_font_size = get_gcin_conf_int(GCIN_FONT_SIZE, 11);
 #if UNIX
   get_gcin_conf_str(GCIN_FONT_NAME, &gcin_font_name, "sans");
 #else
   get_gcin_conf_str(GCIN_FONT_NAME, &gcin_font_name, "MingLiU");
 #endif
-  gcin_font_size_tsin_presel = get_gcin_conf_int(
    GCIN_FONT_SIZE_TSIN_PRESEL, 16);
-  gcin_font_size_symbol = get_gcin_conf_int(GCIN_FONT_SIZE_SYMBOL, 12);
+  gcin_font_size_tsin_presel = get_gcin_conf_int(
    GCIN_FONT_SIZE_TSIN_PRESEL, 11);
+  gcin_font_size_symbol = get_gcin_conf_int(GCIN_FONT_SIZE_SYMBOL, 11);
   gcin_font_size_tsin_pho_in = get_gcin_conf_int(
       GCIN_FONT_SIZE_TSIN_PHO_IN, 10);
   gcin_font_size_gtab_in = get_gcin_conf_int(GCIN_FONT_SIZE_GTAB_IN,
       10);
-  gcin_font_size_pho_near = get_gcin_conf_int(GCIN_FONT_SIZE_PHO_NEAR,
    14);
+  gcin_font_size_pho_near = get_gcin_conf_int(GCIN_FONT_SIZE_PHO_NEAR,
    11);
   gcin_input_style = get_gcin_conf_int(GCIN_INPUT_STYLE,
       InputStyleOverSpot);
   gcin_root_x = get_gcin_conf_int(GCIN_ROOT_X, 2000);
   gcin_root_y = get_gcin_conf_int(GCIN_ROOT_Y, 2000);
```

10. gcin 程式每種輸入法皆以 2 的次方的數值代表，詳細內容可 man gcin-setup 查看手冊。所有輸入法都使用的數字爲 2147483647，要取消某種輸入法只要將其數字扣除即可。舉例：設定預設只有「倉頡五 2」、「注音 3」、「詞音 6」、「簡易 11」「亂倉打鳥 16」等五種輸入法，總數扣除其數字後爲 2147420235，此數字以 16 進位表示爲 7FFF084B。

```
[root@dywH ~]# echo '2147483647-\
2^0-2^1-2^4-2^5-2^7-2^8-2^9-2^10-2^12-2^13-2^14-2^15' | bc
2147420236
[root@dywH ~]# echo 'obase=16; 2147483647-\
2^0-2^1-2^4-2^5-2^7-2^8-2^9-2^10-2^12-2^13-2^14-2^15' | bc
7FFF084C
[root@dywH ~]#
```

11. gcin 循環鍵選擇輸入法預設所有輸入法，但有很多輸入法很少用，所以設定預設只有「倉頡五 2」、「注音 3」、「詞音 6」、「簡易 11」「亂倉打鳥 16」等五種輸入法。

```
@@ -86,12 +86,12 @@
   gcin_init_im_enabled = true;
 #endif

-  gcin_flags_im_enabled = get_gcin_conf_int(GCIN_FLAGS_IM_ENABLED,0
    x7fffffff);
+  gcin_flags_im_enabled = get_gcin_conf_int(GCIN_FLAGS_IM_ENABLED,0
    x7FFF084C);
   gcin_remote_client = get_gcin_conf_int(GCIN_REMOTE_CLIENT, 0);
   gcin_shift_space_eng_full = get_gcin_conf_int(
       GCIN_SHIFT_SPACE_ENG_FULL, 1);
   gcin_capslock_lower = get_gcin_conf_int(GCIN_CAPSLOCK_LOWER, 1);
```

12. 第一次內定設定使用「倉頡五 2」。

```
-  default_input_method = get_gcin_conf_int(DEFAULT_INPUT_METHOD, 6);
+  default_input_method = get_gcin_conf_int(DEFAULT_INPUT_METHOD, 2);
   left_right_button_tips = get_gcin_conf_int(LEFT_RIGHT_BUTTON_TIPS, 1)
       ;
   gcin_im_toggle_keys = get_gcin_conf_int(GCIN_IM_TOGGLE_KEYS, 0);
 #if TRAY_ENABLED
```

13. gcin 「由詞庫自動選字」會造成有多頁符合字無法使用空白鍵換頁。尤其使用「簡易輸入法」的情境，往往是在無法完整輸入倉頡碼時使用，只輸入字型的倉頡前後兩個碼符合的字可能好幾頁，若無法換頁會很困擾，所以將「自動」改爲「關閉」。

```
@@ -106,7 +106,7 @@

   gtab_dup_select_bell = get_gcin_conf_int(GTAB_DUP_SELECT_BELL, 0);
   gtab_space_auto_first = get_gcin_conf_int(GTAB_SPACE_AUTO_FIRST,
       GTAB_space_auto_first_none);
-  gtab_auto_select_by_phrase = get_gcin_conf_int(
    GTAB_AUTO_SELECT_BY_PHRASE, GTAB_AUTO_SELECT_BY_PHRASE_AUTO);
+  gtab_auto_select_by_phrase = get_gcin_conf_int(
    GTAB_AUTO_SELECT_BY_PHRASE, GTAB_AUTO_SELECT_BY_PHRASE_NO);
   gtab_pre_select = get_gcin_conf_int(GTAB_PRE_SELECT, 1);
   gtab_press_full_auto_send = get_gcin_conf_int(
       GTAB_PRESS_FULL_AUTO_SEND, 1);
   gtab_disp_partial_match = get_gcin_conf_int(GTAB_DISP_PARTIAL_MATCH,
       1);
```

14. 預設輸入選單「垂直顯示」。

```
@@ -117,7 +117,7 @@
```

```
    gtab_hide_row2 = get_gcin_conf_int(GTAB_HIDE_ROW2, 0);
    gtab_in_row1 = get_gcin_conf_int(GTAB_IN_ROW1, 0);
    gtab_capslock_in_eng = get_gcin_conf_int(GTAB_CAPSLOCK_IN_ENG, 1);
-   gtab_vertical_select = get_gcin_conf_int(GTAB_VERTICAL_SELECT, 0);
+   gtab_vertical_select = get_gcin_conf_int(GTAB_VERTICAL_SELECT, 1);
    gtab_unique_auto_send = get_gcin_conf_int(GTAB_UNIQUE_AUTO_SEND, 0);
    gtab_que_wild_card = get_gcin_conf_int(GTAB_QUE_WILD_CARD, 0);
```

15. 修改原始碼後，要重新打包壓縮

```
[dywang@dywH SOURCES]$ tar jcvf gcin-1.5.1.tar.bz2 gcin-1.5.1
```

16. 重新建立 RPM 二進位檔

```
[dywang@dywH SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
    SPECS/gcin.spec
Building target platforms: x86_64
Building for target x86_64
error: Failed build dependencies:
    qt3-devel is needed by gcin-1.5.1-1.el6.dyw.x86_64
    libXtst-devel is needed by gcin-1.5.1-1.el6.dyw.x86_64
    anthy-devel is needed by gcin-1.5.1-1.el6.dyw.x86_64
```

17. 安裝 gcin 開發相依套件

```
[dywang@dywH SOURCES]$ sudo yum install libXtst-devel anthy-devel qt3-
    devel
```

18. 再重新建立 RPM 二進位檔，選項 -bb 只產生 RPM 檔，不產生 SRPM 檔。

```
[dywang@dywH SOURCES]$ rpmbuild -bb --target=$(uname -m) ../SPECS/gcin.
    spec
```

19. 查看產生的 RPM 及 SRPM 檔。

```
[dywang@dywH SOURCES]$ ll ../RPMS/x86_64/
total 3592
-rw-r--r--. 1 dywang dywang 3676583 Jul 31 10:44 gcin-1.5.1-1.el6.dyw.
    x86_64.rpm
[dywang@dywH SOURCES]$ ll ../SRPMS/x86_64/
ls: cannot access ../SRPMS/x86_64/: No such file or directory
```

20. 建立 RPM 及 SRPM 二進位檔

```
[dywang@dywH SOURCES]$ rpmbuild -bs --target=$(uname -m) ../SPECS/gcin.
    spec
Building target platforms: x86_64
Building for target x86_64
Wrote: /root/rpmbuild/SRPMS/gcin-1.5.1-1.el6.dyw.src.rpm
[dywang@dywH SOURCES]$ ll ../SRPMS/
total 3564
-rw-r--r--. 1 dywang dywang 3648959 Jul 31 10:50 gcin-1.5.1-1.el6.dyw.
    src.rpm
```

21. 同時建立 RPM 及 SRPM 二進位檔

```
[dywang@dywH SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
    SPECS/gcin.spec
```

18.8 gcin-2.7.4 套件實例

1. gcin-1.5.1 版詞音輸入法中的拼音，只有「聲調拼音」，沒有不含聲調的拼音。升級至 2.7.2 版有「無聲調拼音」，但安裝完後仍然需要修改設定，所以，修改 gcin rpm 安裝程序再重新建立 RPM 套件。

2. 下載 SRPM 套件

```
[dywang@dywH ~]$ cd rpmbuild
[dywang@dywH rpmbuild]$ wget ftp://ftp.pbone.net/mirror/ftp5.gwdg.de/pub
    /opensuse/\
repositories/home%3A/swyear%3A/gcin-fedora/CentOS_CentOS-6/src/gcin
    -2.7.4-1.3.src.rpm
```

3. 安裝 SRPM 套件

```
[dywang@dywH rpmbuild]$ rpm -ivh gcin-2.7.4-1.3.src.rpm
```

4. 至原始碼目錄中查看檔案。

```
[dywang@dywH rpmbuild]$ cd SOURCE
[dywang@dywH SOURCES]$ ls gcin-2.*z
gcin-2.7.4.tar.xz
```

5. 解壓縮原始碼 tarball，產生 gcin-2.7.4 目錄，存放原始碼。

```
[dywang@dywH SOURCES]$ tar xf gcin-2.7.4.tar.xz
```

6. 至 gcin-2.7.4 目錄，查看檔案。

```
[dywang@dywH SOURCES]$ cd gcin-2.7.4
[dywang@dywH gcin-2.7.4]$ ls
about.cpp               gtab-buf.h            qt-im
a.txt                   gtab.cpp              README.html
AUTHORS                 gtab-dbg.cpp          regression.txt
bak                     gtab.h                scripts
cache.cpp               gtab-init.cpp         setup-rpm
Changelog.html          gtab-list.cpp         sim2trad.cpp
config.h                gtab-list.h           statistic.cpp
configure               gtab-merge.cpp        suffixes-rule
COPYING                 gtab-phrase-db.h      t2s-file.h
data                    gtab-tsin-fname.cpp   t2s-lookup.cpp
eggtrayicon.cpp         gtab-use-count.cpp    table-update.cpp
eggtrayicon.h           gtab-util.cpp         tchs
eve.cpp                 gtk3-im               tenv
fullchar.cpp            gtk_bug_fix.c         tenvq
gcb.cpp                 gtk-im                tgdb
gcin2tab.cpp            html-browser.cpp      tray.cpp
gcin-common.cpp         IC.cpp                tray-win32.cpp
gcin-conf.cpp           IC.h                  tsa2d32.cpp
gcin-conf.h             icons                 tscr
gcin.cpp                im-addr.cpp           tsd2a32.cpp
gcin-crypt.cpp          im-client             ts-download.cpp
gcin-endian.h           im-dispatch.cpp       ts-edit.cpp
gcin-exec-script.cpp    IMdkit                tsin2gtab-phrase.cpp
gcin-exit.cpp           im-srv.cpp            tsin-char.cpp
gcin-fedora.spec        im-srv.h              tsin.cpp
gcin-fedora.spec.in     juyin-learn.cpp       tsin.h
gcin_filter             kbmcv.cpp             tsin-parse.cpp
gcin-gb-toggle.cpp      lang.cpp              tsin-parse.h
gcin-gtk-compatible.h   lang.h                tsin-scan.cpp
gcin.h                  Licnese.txt           tsin-util.cpp
gcin-icon.cpp           locale.cpp            tslearn.cpp
gcin-kbm-toggle.cpp     Makefile              ts-share.h
gcin-message.cpp        man                   ts-upload.cpp
gcin-module-cb.cpp      menu                  tutf8
gcin-module-cb.h        mitem.h               tval
gcin-module.cpp         modules               txim
gcin-module.h           os-dep.h              unix-exec.cpp
gcin.png                pho2pinyin.cpp        util.cpp
gcin-send.cpp           phoa2d.cpp            util.h
```

```
gcin-settings.cpp       pho.cpp                 VERSION.gcin
gcin-setup.cpp          phod2a.cpp              win0.cpp
gcin-setup-gtab.cpp     pho-dbg.cpp             win1.cpp
gcin-setup-list.cpp     pho.h                   win1.h
gcin-setup-pho.cpp      pho-kbm-name.cpp        win32-utf8-signature.txt
gcin.spec.in            pho-kbm-name.h          win-gtab.cpp
gcin-state.h            pho-lookup.cpp          win-inmd-switch.cpp
gcin.test               pho-play.cpp            win-kbm.cpp
gcin-version.h          pho-status.h            win-message.cpp
gen-deb                 pho-sym.cpp             win-pho.cpp
gen-dist                pho-util.cpp            win-pho-near.cpp
gen-fedora              phrase.cpp              win-save-phrase.cpp
gen-unix                phrase-save-menu.cpp    win-save-phrase.h
gen-win32               pin-juyin.cpp           win-sym.cpp
gen-win32-tsin          pinyin.cpp              win-sym.h
gst.h                   po
gtab-buf.cpp            qt4-im
```

7. 修改 RPM spec 規格檔，版本加入 dyw。DYW Linux 使用 gtk2 圖形界面，故只在章節%post gtk2 加入修改腳本，並修改檔案 redhat-linux-gnu 爲 unknown-linux-gnu。

```
[dywang@dywH SOURCES]$ vim ../SPECS/gcin.spec
Release:        1.3.dyw

.......
%post gtk2
if [ $1 -eq 1 ] ; then
    # For upgrades, the cache will be regenerated by the new package's
       %%postun
    file="/etc/gtk-2.0/%{_arch}-unknown-linux-gnu/gtk.immodules"
    gtk-query-immodules-2.0-%{__isa_bits} > $file || :
    if ! grep "im-gcin.so" $file; then
        echo "\"/usr/lib64/gtk-2.0/immodules/im-gcin.so\"" >> $file
        echo "\"gcin\" \"gcin Input Method\" \"gcin\" \"/usr/share/
           locale\" \"*\"" >> $file
    fi
    gd="/etc/X11/xinit/xinput.d"
    cd $gd
    gf="/etc/X11/xinit/xinput.d/gcin.conf"
    ln -sf $gd/gcin.conf /etc/alternatives/xinputrc
    [ ! -e none.conf.orig  -a ! -L none.conf ] && mv none.conf none.conf
       .orig
    ln -sf gcin.conf none.conf
    grep '^pkill gcin' /etc/gdm/PreSession/Default
    [ $? -ne 0 ] && echo 'pkill gcin' >> /etc/gdm/PreSession/Default

    sed -i 's/^\(XIM_ARGS=\"\)/\1C_CTYPE=zh_TW.UTF-8\ /' $gf
fi
.......
%postun gtk2
```

```
gtk-query-immodules-2.0-%{__isa_bits} > /etc/gtk-2.0/%{_arch}-unknown-
    linux-gnu/gtk.immodules || :
.......
```

8. 輸入法預設值修改，檔案在 gcin-settings.cpp。

```
[dywang@dywH gcin-2.7.4]$ diff -uN ../gcin-2.7.4.orig/gcin-settings.cpp
    gcin-settings.cpp
--- ../gcin-2.7.4.orig/gcin-settings.cpp    2011-12-31
    15:47:58.000000000 +0800
+++ gcin-settings.cpp   2015-03-20 09:48:21.705148031 +0800
@@ -71,17 +71,17 @@
```

9. 部分顯示字型過大，都改爲 12。

```
 void load_setttings()
 {
-  gcin_font_size = get_gcin_conf_int(GCIN_FONT_SIZE, 16);
+  gcin_font_size = get_gcin_conf_int(GCIN_FONT_SIZE, 12);
 #if UNIX || 1
   get_gcin_conf_str(GCIN_FONT_NAME, &gcin_font_name, "Sans");
 #else
   get_gcin_conf_str(GCIN_FONT_NAME, &gcin_font_name, "MingLiU Bold");
 #endif
-  gcin_font_size_tsin_presel = get_gcin_conf_int(
    GCIN_FONT_SIZE_TSIN_PRESEL, 16);
+  gcin_font_size_tsin_presel = get_gcin_conf_int(
    GCIN_FONT_SIZE_TSIN_PRESEL, 12);
   gcin_font_size_symbol = get_gcin_conf_int(GCIN_FONT_SIZE_SYMBOL, 12);
-  gcin_font_size_tsin_pho_in = get_gcin_conf_int(
    GCIN_FONT_SIZE_TSIN_PHO_IN, 13);
+  gcin_font_size_tsin_pho_in = get_gcin_conf_int(
    GCIN_FONT_SIZE_TSIN_PHO_IN, 12);
   gcin_font_size_gtab_in = get_gcin_conf_int(GCIN_FONT_SIZE_GTAB_IN,
       10);
-  gcin_font_size_pho_near = get_gcin_conf_int(GCIN_FONT_SIZE_PHO_NEAR,
    14);
+  gcin_font_size_pho_near = get_gcin_conf_int(GCIN_FONT_SIZE_PHO_NEAR,
    12);
   gcin_font_size_win_kbm = get_gcin_conf_int(GCIN_FONT_SIZE_WIN_KBM,
       10);
   gcin_font_size_win_kbm_en = get_gcin_conf_int(
       GCIN_FONT_SIZE_WIN_KBM_EN, 8);
   gcin_input_style = get_gcin_conf_int(GCIN_INPUT_STYLE,
       InputStyleOverSpot);
```

10. 開啓應用程式預設使用中文輸入法，但在 Linux 上常用終端命令，開啓中文輸入會成困擾，所以取消預設啓動。

```
@@ -92,7 +92,7 @@
   gcin_eng_phrase_enabled = get_gcin_conf_int(GCIN_ENG_PHRASE_ENABLED,
       1);
   gcin_tray_hf_win_kbm = get_gcin_conf_int(GCIN_TRAY_HF_WIN_KBM, 0);
 #if UNIX
-  gcin_init_im_enabled = get_gcin_conf_int(GCIN_INIT_IM_ENABLED, 1);
+  gcin_init_im_enabled = get_gcin_conf_int(GCIN_INIT_IM_ENABLED, 0);
 #else
```

11. gcin-2.7.4 所有輸入法列表，每行第一個欄位爲「輸入法名稱」，第二位欄位爲「代表符號」，第三欄位爲「對應檔案」，第四欄位爲「使用圖示」。注意「代表符號」對應到程式的撰寫及快速鍵。

```
[dywang@dywH ~]$ cd rpmbuild/SOURCES/gcin-2.7.4
[dywang@dywH gcin-2.7.4]$ cat data/gtab.list
EN e !EN gcin-tray.png

#####符號輸出類#########
# ↓↓↓ ~/.gcin/symbol-table
符號表 4 !SYMBOL_TABLE symbol_table.png
符號小鍵盤 , symbols.gtab symbols.png

#####注音/拼音類#########
注音 3 !PHO juyin.png
詞音/拼音 6 !TSIN tsin.png
!新酷音 [ chewing-module.so chewing.png
#拼音 5 pinyin.gtab pinyin.png
# gtab 拼音現在不用了，改用詞音的拼音

#####倉頡類#########
倉頡 1 cj.gtab cj.png
#標點倉頡 4 cj-punc.gtab cj-punc.png
倉五 2 cj5.gtab cj5.png
亂倉打鳥 \ NewCJ3.gtab NewCJ3.png
五四三倉頡 2 cj543.gtab cj543.png
#五四三倉頡會由詞庫自動選字  http://hyperrate.com/thread.php?tid=12828
速成/簡易 - simplex.gtab simplex.png
標點簡易 - simplex-punc.gtab simplex-punc.png

#####大易類#########
大易 7 dayi3.gtab dayi3.png
#大易 7 gdayi3.gtab dayi3.png

#####行列類#########
行列 8 ar30.gtab ar30.png
行列大字集 8 ar30-big.gtab ar30-big.png
行列33 8 ar33.gtab ar33.png
```

```
行列符號 8 array-symbols.gtab array-symbols.png

#####其他類#########
嘸蝦米 9 noseeing.gtab noseeing.png
帶調粵拼 ] jyutping.gtab jyutping.png
內碼 0  intcode-module.so intcode.png
#輕鬆 2 ez7.gtab

#####外語類#########
!日本anthy = anthy-module.so kana-nippon.png
hangul / hangul.gtab hangul.png
greek ` greek.gtab greek.png
latin-letters [ latin-letters.gtab latin-letters.png
En-words [ vocabulary.gtab vocabulary.png
russian ? russian.gtab russian.png
### russian by yuriy
```

12. 預設以 Ctrl-Shift 循環 啓動幾乎包含所有輸入法，其中 1 表示倉頡，2 表示倉五及，3 表示注音，如前述對應表。修改後僅保留 123678- 部分常用輸入法。

```
@@ -101,12 +101,12 @@
    gcin_punc_auto_send = get_gcin_conf_int(GCIN_PUNC_AUTO_SEND, 1);
-   get_gcin_conf_str(GCIN_STR_IM_CYCLE, &gcin_str_im_cycle, "
     1234567890-=[]\\");
+   get_gcin_conf_str(GCIN_STR_IM_CYCLE, &gcin_str_im_cycle, "123678-");
    gcin_remote_client = get_gcin_conf_int(GCIN_REMOTE_CLIENT, 0);
    gcin_shift_space_eng_full = get_gcin_conf_int(
        GCIN_SHIFT_SPACE_ENG_FULL, 1);
    gcin_capslock_lower = get_gcin_conf_int(GCIN_CAPSLOCK_LOWER, 1);
```

13. 修改以 Ctrl-Shift 循環 啓動第一次內定由詞音改爲倉頡五輸入法。

```
-   get_gcin_conf_str(DEFAULT_INPUT_METHOD, &default_input_method_str, "6
     ");
+   get_gcin_conf_str(DEFAULT_INPUT_METHOD, &default_input_method_str, "2
     ");
    left_right_button_tips = get_gcin_conf_int(LEFT_RIGHT_BUTTON_TIPS, 1)
        ;
    gcin_im_toggle_keys = get_gcin_conf_int(GCIN_IM_TOGGLE_KEYS, 0);
 #if TRAY_ENABLED
```

14. 外觀顯示預設「按鍵顯示於應用程式」，不但蓋住終端命令輸入，而且在未輸入完中文拼字時切換成「英文」，原未完成的拼字還顯示在螢幕上，造成相當大的困擾，故取消此設定。

```
@@ -195,7 +195,7 @@
   gcin_edit_display = get_gcin_conf_int(GCIN_EDIT_DISPLAY,
       GCIN_EDIT_DISPLAY_OVER_THE_SPOT);
 #endif

-  gcin_on_the_spot_key = get_gcin_conf_int(GCIN_ON_THE_SPOT_KEY, 1);
+  gcin_on_the_spot_key = get_gcin_conf_int(GCIN_ON_THE_SPOT_KEY, 0);
   if (gcin_on_the_spot_key)
     gcin_edit_display = GCIN_EDIT_DISPLAY_ON_THE_SPOT;
```

15. 詞音/拼音輸入鍵盤預設「標準」，如果預設提供陸生使用，鍵盤預設改爲「拼音無聲調」，以滿足其需求。但此設定也會影響到「注音」的輸入，故不修改，僅提供修改參考。

```
@@ -211,7 +211,7 @@
   else
 #endif
   {
-    char *kbm_str = is_chs?"pinyin "N1234" 1 1":"zo "N1234" 1 1";
+    char *kbm_str = is_chs?"pinyin "N1234" 1 1":"pinyin-no-tone "N1234"
     1 1";
     get_gcin_conf_fstr(PHONETIC_KEYBOARD, phokbm, kbm_str);
   }
```

16. 重新建立 RPM 二進位檔，出現需要相依開發套件。

```
[dywang@dywH SOURCES]$ rpmbuild -bb --target=$(uname -m) ../SPECS/gcin.
    spec
Building target platforms: x86_64
Building for target x86_64
error: Failed build dependencies:
    qt-devel is needed by gcin-2.7.4-1.3.dyw.x86_64
    gtk2-devel is needed by gcin-2.7.4-1.3.dyw.x86_64
    libXtst-devel is needed by gcin-2.7.4-1.3.dyw.x86_64
    anthy-devel is needed by gcin-2.7.4-1.3.dyw.x86_64
```

17. 安裝 gcin 開發相依套件

```
[dywang@dywH SOURCES]$ yum install qt-devel gtk2-devel libXtst-devel
    anthy-devel
```

18. 同時建立 RPM 及 SRPM 二進位檔字，無法成功建立的訊息最後幾行如下，顯示函式 libgdk-x11-2.0.so 錯誤。

```
...................
/usr/lib/gcc/x86_64-redhat-linux/4.4.4/../../../../lib64/libgdk-x11-2.0.
    so: undefined reference to `_XGetRequest'
collect2: ld returned 1 exit status
make: *** [gcin] Error 1
error: Bad exit status from /var/tmp/rpm-tmp.AqAfaH (%build)


RPM build errors:
    Bad exit status from /var/tmp/rpm-tmp.AqAfaH (%build)
```

19. 以 ldd 命令測試錯誤的函式。

```
[dywang@dywH SOURCES]$ ldd -r -d /usr/lib/gcc/x86_64-redhat-linux
    /4.4.4/../../../../lib64/libgdk-x11-2.0.so
    linux-vdso.so.1 =>  (0x00007fffc15ec000)
    libpangocairo-1.0.so.0 => /usr/lib64/libpangocairo-1.0.so.0 (0
        x00007fc680d91000)
    libpango-1.0.so.0 => /usr/lib64/libpango-1.0.so.0 (0
        x00007fc680b45000)
    libfontconfig.so.1 => /usr/lib64/libfontconfig.so.1 (0
        x00007fc68090f000)
    libXext.so.6 => /usr/lib64/libXext.so.6 (0x00007fc6806fd000)
    libXrender.so.1 => /usr/lib64/libXrender.so.1 (0x00007fc6804f3000)
    libXinerama.so.1 => /usr/lib64/libXinerama.so.1 (0x00007fc6802f0000)
    libXi.so.6 => /usr/lib64/libXi.so.6 (0x00007fc6800e1000)
    libXrandr.so.2 => /usr/lib64/libXrandr.so.2 (0x00007fc67fed9000)
    libXcursor.so.1 => /usr/lib64/libXcursor.so.1 (0x00007fc67fcce000)
    libXcomposite.so.1 => /usr/lib64/libXcomposite.so.1 (0
        x00007fc67facc000)
    libXdamage.so.1 => /usr/lib64/libXdamage.so.1 (0x00007fc67f8ca000)
    libXfixes.so.3 => /usr/lib64/libXfixes.so.3 (0x00007fc67f6c4000)
    libcairo.so.2 => /usr/lib64/libcairo.so.2 (0x00007fc67f44b000)
    libX11.so.6 => /usr/lib64/libX11.so.6 (0x00007fc67f10c000)
    libgdk_pixbuf-2.0.so.0 => /usr/lib64/libgdk_pixbuf-2.0.so.0 (0
        x00007fc67eeec000)
    libgio-2.0.so.0 => /lib64/libgio-2.0.so.0 (0x00007fc67ebdb000)
    libgobject-2.0.so.0 => /lib64/libgobject-2.0.so.0 (0
        x00007fc67e98f000)
    libglib-2.0.so.0 => /lib64/libglib-2.0.so.0 (0x00007fc67e689000)
    libm.so.6 => /lib64/libm.so.6 (0x00007fc67e405000)
    libpthread.so.0 => /lib64/libpthread.so.0 (0x00007fc67e1e8000)
    libc.so.6 => /lib64/libc.so.6 (0x00007fc67de54000)
    libpangoft2-1.0.so.0 => /usr/lib64/libpangoft2-1.0.so.0 (0
        x00007fc67dc2a000)
    libgmodule-2.0.so.0 => /lib64/libgmodule-2.0.so.0 (0
        x00007fc67da27000)
    libfreetype.so.6 => /usr/lib64/libfreetype.so.6 (0x00007fc67d78a000)
    libexpat.so.1 => /lib64/libexpat.so.1 (0x00007fc67d562000)
    libpixman-1.so.0 => /usr/lib64/libpixman-1.so.0 (0x00007fc67d2d9000)
    libpng12.so.0 => /usr/lib64/libpng12.so.0 (0x00007fc67d0b3000)
```

```
    libz.so.1 => /lib64/libz.so.1 (0x00007fc67ce9d000)
    libxcb.so.1 => /usr/lib64/libxcb.so.1 (0x00007fc67cc7e000)
    libdl.so.2 => /lib64/libdl.so.2 (0x00007fc67ca7a000)
    libgthread-2.0.so.0 => /lib64/libgthread-2.0.so.0 (0
        x00007fc67c876000)
    librt.so.1 => /lib64/librt.so.1 (0x00007fc67c66d000)
    libresolv.so.2 => /lib64/libresolv.so.2 (0x00007fc67c453000)
    libselinux.so.1 => /lib64/libselinux.so.1 (0x00007fc67c234000)
    /lib64/ld-linux-x86-64.so.2 (0x00000034dae00000)
    libXau.so.6 => /usr/lib64/libXau.so.6 (0x00007fc67c030000)
undefined symbol: _XGetRequest  (/usr/lib/gcc/x86_64-redhat-linux
    /4.4.4/../../../../lib64/libgdk-x11-2.0.so)
```

20. 查詢函式屬於套件 gtk2-devel。

```
[dywang@dywH SOURCES]$ rpm -qf /usr/lib64/libgdk-x11-2.0.so
gtk2-devel-2.20.1-4.el6.x86_64
```

21. 查詢 gtk2 相關套件，發現 gtk2-engines 套件與 gtk2 套件版本不同。

```
[dywang@dywH SOURCES]$ rpm -qa | grep ^gtk2
gtk2-2.20.1-4.el6.x86_64
gtk2-devel-2.20.1-4.el6.x86_64
gtk2-engines-2.18.4-5.el6.dyw.x86_64
```

22. 因爲 gtk2-engines 套件是作者重新建立的 RPM 套件，因此將 gtk2 及 gtk2-devel 降版本安裝回 2.18.4-5 版本。

```
[dywang@dywH SOURCES]$ yum downgrade gtk2 gtk2-devel
```

23. 再同時建立 RPM 及 SRPM 二進位檔字，成功建立的訊息最後幾行，看到產生 gcin-gtk2, gcin-qt4 gcin 三個 RPM 檔及一個 gcin SRPM 檔。

```
[dywang@dywH SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
    SPECS/gcin.spec
...................
Wrote: /root/rpmbuild/SRPMS/gcin-2.7.4-1.3.dyw.src.rpm
Wrote: /root/rpmbuild/RPMS/x86_64/gcin-2.7.4-1.3.dyw.x86_64.rpm
Wrote: /root/rpmbuild/RPMS/x86_64/gcin-gtk2-2.7.4-1.3.dyw.x86_64.rpm
Wrote: /root/rpmbuild/RPMS/x86_64/gcin-qt4-2.7.4-1.3.dyw.x86_64.rpm
Executing(%clean): /bin/sh -e /var/tmp/rpm-tmp.0MB2uA
+ umask 022
+ cd /home/dywang/rpmbuild/BUILD
```

```
+ cd gcin-2.7.4
+ /bin/rm -rf /home/dywang/rpmbuild/BUILDROOT/gcin-2.7.4-1.3.dyw.x86_64
+ exit 0
```

24. 安裝 gcin 開發相依套件

```
[dywang@dywH SOURCES]$ sudo cp ../RPMS/x86_64/gcin-* /var/ftp/pub/
    centos6/crtPackages
```

25. 以 root 身份重新建立 repo 資料庫，repogroup.sh 爲自行撰寫的腳本。

```
[root@dywH Packages]$ repogroup.sh
1793/1793 - vartmp/openssl-1.0.0-27.el6.x86_64.rpm
Saving Primary metadata
Saving file lists metadata
Saving other metadata
Loaded plugins: fastestmirror, refresh-packagekit
Cleaning up Everything
Cleaning up list of fastest mirrors
```

26. 重新安裝 gcin，因本系統使用 gtk2，故必須安裝 gcin-gtk2，yum 會自動將 gcin 也一起安裝起來。否則只安裝 gcin 套件，將無法工作。

```
[dywang@dywH ~]$ sudo yum reinstall gcin-gtk2 gcin
```

18.9 gcin-2.7.4 套件修正

1. DYW Linux 輸入法預設只安裝 gcin 套件，進入圖形界面時 imsettings-start 重複執行而出現警告訊息。

```
IMOpenIM 'gcin' failed. Maybe another XIM server is running
```

2. 修改套件在登入圖形界面前加上 pkill gcin，先刪除執行中的 gcin。

```
    grep '^pkill gcin' /etc/gdm/PreSession/Default
    [ $? -ne 0 ] && echo 'pkill gcin' >> /etc/gdm/PreSession/Default
```

3. 但以上刪除 gcin 程序的動作，在??? 螢幕下運作時使用 gdm 切換使用者及退出螢幕即死當，升級 gdm 套件版本爲 2.30.4-21.el6.x86_64 時輸入密碼後無動作。爲解決此一問題，再次修改 gcin 套件並與原始套件比對。

4. 建立抽取原始 SRPM 套件內容的暫存目錄 sources，並切換至該目錄。

```
[dywang@dywH ~]$ mkdir sources
[dywang@dywH rpmbuild]$ cd sources/
```

5. 不安裝套件的情況下，抽取原始 SRPM 套件內容。

```
[dywang@dywH sources]$ rpm2cpio ../gcin-2.7.4-1.3.src.rpm | cpio -idvm
gcin-2.7.4.tar.xz
gcin.conf
gcin.spec
5924 blocks
```

6. 比對修改前後的 gcin.spec。

```
[dywang@dywH sources]$ diff -uN gcin.spec ../SPECS/gcin.spec
--- gcin.spec   2012-09-30 06:58:24.000000000 +0800
+++ ../SPECS/gcin.spec  2015-08-06 12:14:52.621296600 +0800
```

7. 版本加上.dyw。

```
@@ -1,6 +1,6 @@
 Name:           gcin
 Version:        2.7.4
-Release:        1.3
+Release:        1.3.dyw
 Summary:        Input method for Traditional Chinese

 Group:          System Environment/Libraries
```

8. 由於 DYW 圖形界面只使用 gnome，因此只要安裝 gcin-gtk2 就同時執行新增的修改腳本。

```
@@ -87,9 +87,32 @@
 %{_sbindir}/alternatives --install %{_sysconfdir}/X11/xinit/xinputrc
     xinputrc %{_sysconfdir}/X11/xinit/xinput.d/gcin.conf 40

 %post gtk2
-if [ $1 -eq 1 ] ; then
+if true ; then
```

9. 由於 DYW 不是使用 redhat-linux-gnu 套件，因此修改成 unknown-linux-gnu 預設使用 gcin。

```
     # For upgrades, the cache will be regenerated by the new package's
         %%postun
-    gtk-query-immodules-2.0-%{__isa_bits} > /etc/gtk-2.0/%{_arch}-
    redhat-linux-gnu/gtk.immodules || :
+   mkdir /etc/gtk-2.0/%{_arch}-unknown-linux-gnu 2>/dev/null
+   file="/etc/gtk-2.0/%{_arch}-unknown-linux-gnu/gtk.immodules"
+    gtk-query-immodules-2.0-%{__isa_bits} > $file || :
+   if ! grep -q "im-gcin.so" $file; then
+       echo "\"/usr/lib64/gtk-2.0/immodules/im-gcin.so\"" >> $file
+       echo "\"gcin\" \"gcin Input Method\" \"gcin\" \"/usr/share/
    locale\" \"*\"" >> $file
+   fi
+
+   (
+   gd="/etc/X11/xinit/xinput.d"
+   cd $gd
+   gf="/etc/X11/xinit/xinput.d/gcin.conf"
+   ln -sf $gd/gcin.conf /etc/alternatives/xinputrc
+   [ ! -e none.conf.orig  -a ! -L none.conf ] && mv none.conf none.conf
    .orig
+   ln -sf gcin.conf none.conf
```

10. 刪除之前安裝 gcin 產生的 pkill gcin 動作。

```
+   sed -i '/pkill gcin/d' /etc/gdm/PreSession/Default
```

11. 將登入圖形界面自動執行的輸入法啓動程式 imsettings-start 刪除，以避免重

複執行 gcin，而出現警告訊息。

```
+   mv -f /etc/xdg/autostart/imsettings-start.desktop /etc/xdg/autostart
    /imsettings-start.error 2>/dev/null
```

12. 設定輸入語系環境爲 zh_TW.UTF-8。

```
+   sed -i 's/^\(XIM_ARGS=\"\)/\1C_CTYPE=zh_TW.UTF-8\ /' $gf
+   )
```

13. gtk 輸入法註冊直接更新 cache，而不送到 stdout。

```
+   gtk-query-immodules-2.0-%{__isa_bits} --update-cache
 fi

 %if 0%{?fedora_version}
```

14. 由於 DYW 不是使用 redhat-linux-gnu 套件，因此 gtk 輸入法註冊結果改送到 unknown-linux-gnu。

```
@@ -105,7 +128,7 @@
 update-desktop-database %{_datadir}/applications >/dev/null 2>&1 || :

 %postun gtk2
-gtk-query-immodules-2.0-%{__isa_bits} > /etc/gtk-2.0/%{_arch}-redhat-
    linux-gnu/gtk.immodules || :
+gtk-query-immodules-2.0-%{__isa_bits} > /etc/gtk-2.0/%{_arch}-unknown-
    linux-gnu/gtk.immodules || :

 %if 0%{?fedora_version}
 %postun gtk3
```

18.10 firefox-24 套件實例

1. firefox-18 版不適用 https://mega.co.nz/，必須更新版本，firefox-24.2.0 爲 CentOS 6 最接近 18 的版本，用此版本要更動的相依套件最少。

2. 下載 SRPM 套件

```
[dywang@dywH ~]$ cd rpmbuild
[dywang@dywH rpmbuild]$ wget ftp://ftp.icm.edu.pl/vol/rzm5/linux-slc/\
updates/slc6X/SRPMS/firefox-24.2.0-1.el6_5.src.rpm
```

3. 安裝 SRPM 套件

```
[dywang@dywH rpmbuild]$ rpm -ivh firefox-24.2.0-1.el6_5.src.rpm
```

4. 至原始碼目錄中查看檔案。

```
[dywang@dywH rpmbuild]$ cd SOURCE
[dywang@dywH SOURCES]$ ls firefox-24*tar*
firefox-24.2.0esr.source.tar.bz2
```

5. 解壓縮原始碼 tarball，產生 mozilla-esr24 目錄，存放原始碼。

```
[dywang@dywH SOURCES]$ tar jxvf firefox-24.2.0esr.source.tar.bz2
```

6. 至 mozilla-esr24 目錄，查看檔案。

```
[dywang@dywH SOURCES]$ ls mozilla-esr24/
accessible  config        intl         moz.build            services
aclocal.m4  configure     ipc          mozglue              startupcache
addon-sdk   configure.in  js           mozilla-config.h.in  storage
Android.mk  content       layout       netwerk              testing
AUTHORS     db            LEGAL        nsprpub              toolkit
b2g         docshell      LICENSE      other-licenses       tools
browser     dom           mach         parser               uriloader
build       editor        Makefile.in  probes               view
caps        embedding     media        profile              webapprt
chrome      extensions    memory       python               widget
client.mk   gfx           mfbt         rdf                  xpcom
client.py   hal           mobile       README.txt           xpfe
CLOBBER     image         modules      security             xulrunner
```

7. 修改 RPM spec 規格檔，版本加入 dyw。

```
[dywang@dywH SOURCES]$ vim ../SPECS/firefox.spec
[dywang@dywH SOURCES]$ grep dyw ../SPECS/firefox.spec
```

```
Release:        1%{?prever}%{?dist}.dyw
```

8. 修改 RPM spec 規格檔，在 %install 段落中，將 firefox-bin 執行檔連結到 firefox，以降低不必要的檔案儲存。

```
[dywang@dywH SOURCES]$ vim ../SPECS/firefox.spec
[dywang@dywH SOURCES]$ grep 'ln -sf' -B2 ../SPECS/firefox.spec
%{__rm} -rf ${RPM_BUILD_ROOT}%{mozappdir}/dictionaries
ln -s %{_datadir}/myspell ${RPM_BUILD_ROOT}%{mozappdir}/dictionaries
(cd $RPM_BUILD_ROOT/%{mozappdir}; ln -sf firefox firefox-bin)
```

9. 修改預設首頁到個人網頁。

```
[dywang@dywH SOURCES]$ grep dyw firefox-redhat-default-prefs.js
pref("browser.startup.homepage",            "data:text/plain,browser.
    startup.homepage=http://dywang.csie.cyut.edu.tw");
pref("startup.homepage_override_url",       "http://dywang.csie.cyut.edu
    .tw");
pref("startup.homepage_welcome_url",        "http://dywang.csie.cyut.edu
    .tw");
```

10. 修改預設編碼爲 UTF-8。

```
[root@dyw219 SOURCES]# vim mozilla-esr24/toolkit/locales/en-US/chrome/
    global/intl.properties
[root@dyw219 SOURCES]# grep intl.charset.default mozilla-esr24/toolkit/
    locales/en-US/chrome/global/intl.properties
# LOCALIZATION NOTE (intl.charset.detector, intl.charset.default, intl.
    charsetmenu.browser.static, intl.charsetmenu.mailedit):
intl.charset.default=UTF-8
intl.charsetmenu.browser.static=UTF-8, ISO-8859-1

[dywang@dywH SOURCES]$ vim mozilla-esr24/toolkit/locales/en-US/chrome/
    global-platform/unix/intl.properties
[dywang@dywH SOURCES]$ grep charset mozilla-esr24/toolkit/locales/en-US/
    chrome/global-platform/unix/intl.properties
intl.charset.default=UTF-8
```

11. 修改 x-western 及 zh-TW 兩種語系預設的字型大小。

```
[dywang@dywH SOURCES]$ vim mozilla-esr24/modules/libpref/src/init/all.js
[dywang@dywH SOURCES]$ egrep 'font.size.*(x\-western|zh\-TW)' \
mozilla-esr24/modules/libpref/src/init/all.js
```

```
pref("font.size.variable.x-western", 14);
pref("font.size.fixed.x-western", 14);
pref("font.size.variable.zh-TW", 15);
pref("font.size.fixed.zh-TW", 14);
pref("font.size.variable.x-western", 14);
pref("font.size.fixed.x-western", 14);
pref("font.size.variable.zh-TW", 15);
pref("font.size.fixed.zh-TW", 14);
pref("font.size.variable.x-western", 14);
pref("font.size.fixed.x-western", 14);
pref("font.size.variable.zh-TW", 15);
pref("font.size.fixed.zh-TW", 14);
pref("font.size.variable.x-western", 14);
pref("font.size.fixed.x-western", 14);
pref("font.size.variable.zh-TW", 15);
pref("font.size.fixed.zh-TW", 14);
pref("font.size.variable.x-western", 14);
pref("font.size.fixed.x-western", 14);
pref("font.size.variable.zh-TW", 15);
pref("font.size.fixed.zh-TW", 14);
```

12. 預設等寬字 monospace，實際使用時不會等寬，故修改成 DejaVu Sans Mono。

```
[dywang@dywH SOURCES]$ vim mozilla-esr24/modules/libpref/src/init/all.js
[dywang@dywH SOURCES]$ egrep 'font.name.monospace.*(x\-western|zh\-TW)'
    \
mozilla-esr24/modules/libpref/src/init/all.js
pref("font.name.monospace.x-western", "DejaVu Sans Mono");
pref("font.name.monospace.zh-TW", "DejaVu Sans Mono");
pref("font.name.monospace.x-western", "DejaVu Sans Mono");
pref("font.name.monospace.zh-TW", "DejaVu Sans Mono");
pref("font.name.monospace.x-western", "DejaVu Sans Mono");
pref("font.name.monospace.zh-TW", "DejaVu Sans Mono");
pref("font.name.monospace.x-western", "Source Code Pro");
pref("font.name.monospace.zh-TW", "Source Code Pro");
pref("font.name.monospace.x-western", "DejaVu Sans Mono");
pref("font.name.monospace.zh-TW", "Droid Sans Mono");
pref("font.name.monospace.x-western", "DejaVu Sans Mono");
```

13. 重新打包壓縮 mozilla-esr24 目錄。

```
[dywang@dywH SOURCES]$ tar jcvf firefox-24.2.0esr.source.tar.bz2 mozilla
    -esr24
```

14. 重新建立 RPM 二進位檔，由於檔案是由不同的主機同步過來，因此出現群組權問題。

```
[dywang@dywH SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
    SPECS/firefox.spec
Building target platforms: x86_64
Building for target x86_64
error: Bad owner/group: /home/dywang/rpmbuild/SOURCES/firefox-24.2.0esr.
    source.tar.bz2
```

15. 查看檔案 uid gid 508 不屬於任何用户。

```
[dywang@dywH SOURCES]$ ll firefox*bz2
-rw-rw-r--. 1 508 508 119863962 Apr  8 21:48 firefox-24.2.0esr.source.
    tar.bz2
-rw-rw-r--. 1 508 508  25759295 Dec  6  2013 firefox-langpacks-24.2.0esr
    -20131206.tar.bz2
```

16. 將 SOURCE 目錄下的所有檔案及次目錄，用户及群組都改成 dywang。

```
[dywang@dywH SOURCES]$ sudo chown dywang.dywang -R .
```

17. 再重新建立 RPM 二進位檔，出現相依套件問題，不同的建立環境缺的套件不會相同，必須把缺的套件都安裝起來。

```
[dywang@dywH SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
    SPECS/firefox.spec
Building target platforms: x86_64
Building for target x86_64
error: Failed build dependencies:
    nasm is needed by firefox-24.2.0-1.el6.dyw.x86_64
    hunspell-devel is needed by firefox-24.2.0-1.el6.dyw.x86_64
    bzip2-devel is needed by firefox-24.2.0-1.el6.dyw.x86_64
    libIDL-devel is needed by firefox-24.2.0-1.el6.dyw.x86_64
    gnome-vfs2-devel is needed by firefox-24.2.0-1.el6.dyw.x86_64
    libgnome-devel is needed by firefox-24.2.0-1.el6.dyw.x86_64
    libgnomeui-devel is needed by firefox-24.2.0-1.el6.dyw.x86_64
    startup-notification-devel is needed by firefox-24.2.0-1.el6.dyw.
        x86_64
    libnotify-devel is needed by firefox-24.2.0-1.el6.dyw.x86_64
    autoconf213 is needed by firefox-24.2.0-1.el6.dyw.x86_64
```

18. 安裝 firefox 開發相依套件。

```
[dywang@dywH SOURCES]$ sudo yum install nasm hunspell-devel bzip2-devel
    \
```

```
2 libIDL-devel gnome-vfs2-devel libgnome-devel libgnomeui-devel \
  startup-notification-devel libnotify-devel autoconf213
```

19. 同時建立 RPM 及 SRPM 二進位檔字，無法成功建立的訊息最後幾行如下，顯示函式 libgdk-x11-2.0.so 錯誤。

```
1 checking for NSPR - version >= 4.10.2... no
  configure: error: your don't have NSPR installed or your version is too
      old
```

20. 更新適合版本的 nspr 套件。

```
[dywang@dywH Packages]$ yum upgrade nspr-* --nogpgcheck
```

21. 再重新建立 RPM 二進位檔，出現以下錯誤訊息。

```
1 [dywang@dywH SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
      SPECS/firefox.spec
  ../../dist/bin/libxul.so: undefined reference to `
      SEC_PKCS7VerifyDetachedSignatureAtTime@NSS_3.15'
3 collect2: ld returned 1 exit status
  make[6]: *** [plugin-container] Error 1
5 ................
  RPM build errors:
7     Bad exit status from /var/tmp/rpm-tmp.zCukuN (%build)
```

22. firefox-24 已經將 libxul.so 納入，不需要再安裝套件 xulrunner。上述問題經查爲目前安裝的 firefox-18，其相依套件 xulrunner-last 不相容。先不考慮其他套件相依問題，只移除 xulrunner-last 套件本身。

```
1 [dywang@dywH ~]$ rpm -e  xulrunner-last --nodeps
```

23. 再同時建立 RPM 及 SRPM 二進位檔字，firefox RPM 建立要 1 小時以上，要耐心等候。成功建立的訊息最後幾行，看到產生 firefox firefox-debuginfo 二個 RPM 檔及一個 firefox SRPM 檔。

```
1 [dywang@dywH SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
      SPECS/firefox.spec
```

```
.....................
Wrote: /home/dywang/rpmbuild/SRPMS/firefox-24.2.0-1.el6.dyw.src.rpm
Wrote: /home/dywang/rpmbuild/RPMS/x86_64/firefox-24.2.0-1.el6.dyw.x86_64
    .rpm
Wrote: /home/dywang/rpmbuild/RPMS/x86_64/firefox-debuginfo-24.2.0-1.el6.
    dyw.x86_64.rpm
Executing(%clean): /bin/sh -e /var/tmp/rpm-tmp.UXFrIf
+ umask 022
+ cd /home/dywang/rpmbuild/BUILD
+ cd firefox-24.2.0
+ /bin/rm -rf /home/dywang/rpmbuild/BUILDROOT/firefox-24.2.0-1.el6.dyw.
    x86_64
+ exit 0
```

24. 複製到 repo 套件庫。

```
[dywang@dywH SOURCES]$ sudo cp ../RPMS/x86_64/firefox-24* /var/ftp/pub/
    centos6/crtPackages
```

25. 以 root 身份重新建立 repo 資料庫，repogroup.sh 爲自行撰寫的腳本。

```
[root@dywH Packages]$ repogroup.sh
[root@dywH Packages]# repogroup.sh
1854/1854 - Packages/libreoffice/libreoffice-ure-3.4.5.2-16.1.el6_3.
    x86_64.rpm
Saving Primary metadata
Saving file lists metadata
Saving other metadata
Loaded plugins: fastestmirror, refresh-packagekit
Cleaning up Everything
```

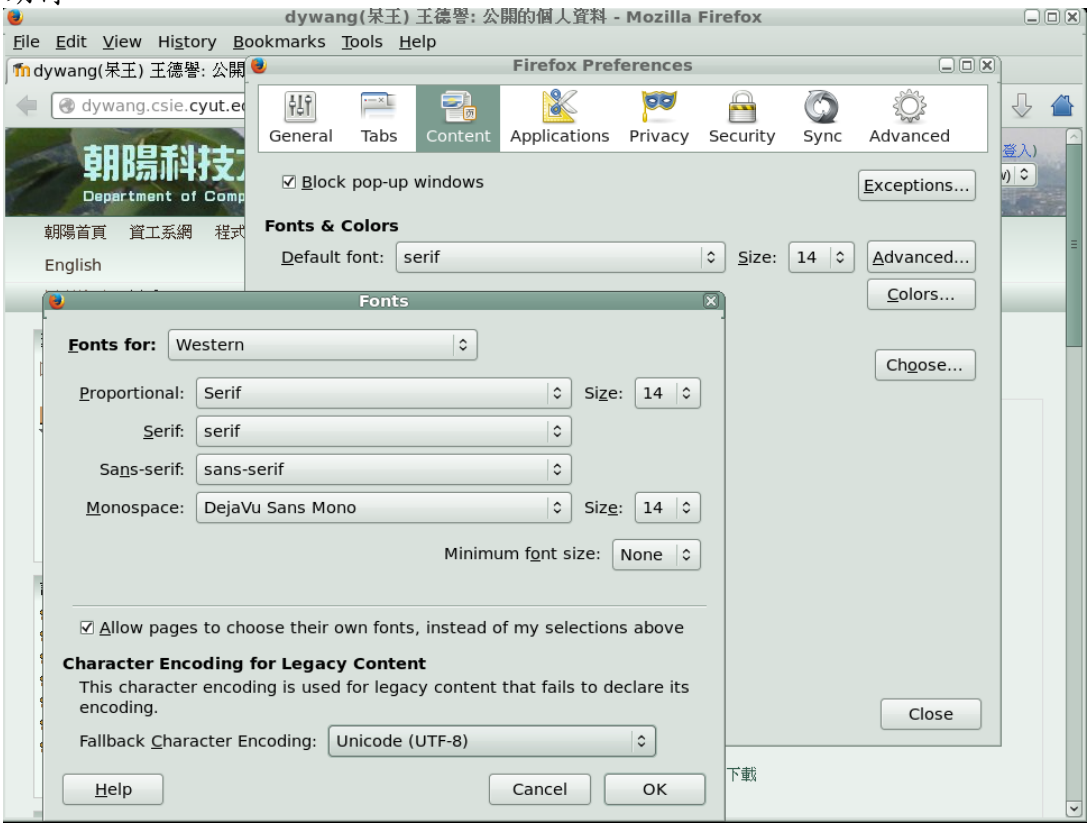
26. 安裝 firefox。

```
[dywang@dywH ~]$ sudo yum install firefox
```

27. 查看 firefox-bin 執行檔，已變成連結檔。

```
[dywang@dywH ~]$ sudo ls -l /usr/lib64/firefox/firefox*
-rwxr-xr-x. 1 root root 98184 Apr 10 11:54 /usr/lib64/firefox/firefox
lrwxrwxrwx. 1 root root     7 Apr 10 12:00 /usr/lib64/firefox/firefox-
    bin -> firefox
-rwxr-xr-x. 1 root root 98184 Apr 10 11:54 /usr/lib64/firefox/firefox
lrwxrwxrwx. 1 root root     7 Apr 10 12:00 /usr/lib64/firefox/firefox-
    bin -> firefox
```

28. 安裝後第一次啓動 firefox，出現個人首頁，且預設字型大小及型式已符合個人期待。



18.11 firefox-31 套件實例

1. 緣由

   (a) firefox v24 自動儲存帳號密碼功能失效。

   (b) firefox v24 Google 地圖拖曳功能失效，原有爲安裝了不相容的附加元件。

   (c) 教師資訊系統個人資訊中有部分程式 firefox-24 版打不開，但再更新成 firefox-31 仍然有問題。

2. 下載 SRPM 套件

```
[dywang@dywH ~]$ cd rpmbuild
[dywang@dywH rpmbuild]$ wget ftp://ftp.pbone.net/mirror/ftp.centos.org/\
6.6/os/x86_64/Packages/firefox-31.1.0-5.el6.centos.x86_64.rpm
```

3. 安裝 SRPM 套件

```
[dywang@dywH rpmbuild]$ rpm -ivh firefox-31.1.0-5.el6.centos.src.rpm
```

4. 查看安裝的所有檔案。

```
[dywang@dywH SOURCES]$ rpm -qpl ../firefox-31.1.0-5.el6.centos.src.rpm
disable-webm.patch
find-external-requires
firefox-31.1.0esr.source.tar.bz2
firefox-centos-default-prefs.js
firefox-default.patch
firefox-duckduckgo.patch
firefox-enable-addons.patch
firefox-enable-plugins.patch
firefox-install-dir.patch
firefox-langpacks-31.1.0esr-20140827.tar.bz2
firefox-mozconfig
firefox-mozconfig-branded
firefox-system-nss-3.16.2.patch
firefox.1
firefox.desktop
firefox.sh.in
firefox.spec
mozilla-python.patch
nullptr.patch
remove-ogg.patch
rhbz-966424.patch
simplejson-2.1.1.tar.gz
xulrunner-24.0-jemalloc-ppc.patch
xulrunner-nspr-version.patch
```

5. 至原始碼目錄中查看檔案。

```
[dywang@dywH rpmbuild]$ cd SOURCE
[dywang@dywH SOURCES]$ ls firefox-31.1.0esr.source.tar.bz2
firefox-31.1.0esr.source.tar.bz2
```

6. 解壓縮原始碼 tarball，產生 mozilla-esr31 目錄，存放原始碼。

```
[dywang@dywH SOURCES]$ tar jxvf firefox-31.1.0esr.source.tar.bz2
```

7. 至 mozilla-esr31 目錄，查看檔案。

```
[dywang@dywH SOURCES]$ ls mozilla-esr31/
accessible  config        intl         moz.build            services
aclocal.m4  configure     ipc          mozglue              startupcache
addon-sdk   configure.in  js           mozilla-config.h.in  storage
Android.mk  content       layout       netwerk              testing
AUTHORS     db            LEGAL        nsprpub              toolkit
b2g         docshell      LICENSE      other-licenses       tools
browser     dom           mach         parser               uriloader
build       editor        Makefile.in  probes               view
caps        embedding     media        profile              webapprt
chrome      extensions    memory       python               widget
client.mk   gfx           mfbt         rdf                  xpcom
client.py   hal           mobile       README.txt           xpfe
CLOBBER     image         modules      security             xulrunner
```

8. 修改 RPM spec 規格檔，版本加入 dyw。

```
[dywang@dywH SOURCES]$ vim ../SPECS/firefox.spec
[dywang@dywH SOURCES]$ grep dyw ../SPECS/firefox.spec -B3
Summary:        Mozilla Firefox Web browser
Name:           firefox
Version:        31.1.0
Release:        5%{?prever}%{?dist}.dyw
```

9. 修改預設首頁到個人網頁。

```
[dywang@dywH SOURCES]$ grep dyw firefox-centos-default-prefs.js
pref("browser.startup.homepage",            "data:text/plain,browser.
    startup.homepage=http://dywang.csie.cyut.edu.tw");
pref("startup.homepage_override_url",       "http://dywang.csie.cyut.edu
    .tw");
pref("startup.homepage_welcome_url",        "http://dywang.csie.cyut.edu
    .tw");
```

10. 將開啓 firefox 預設改爲顯示上次開啓的網頁。

```
[dywang@dywH SOURCES]$ vim mozilla-esr31/browser/locales/en-US/\
chrome/browser/preferences/main.dtd
[dywang@dywH SOURCES]$ grep 'Show' mozilla-esr31/browser/locales/\
en-US/chrome/browser/preferences/main.dtd --color
<!ENTITY startupLastSession.label  "Show my windows and tabs from last
    time">
<!ENTITY startupHomePage.label     "Show my home page">
<!ENTITY startupBlankPage.label    "Show a blank page">
```

11. 修改預設編碼爲 UTF-8。

```
[root@dyw219 SOURCES]# vim mozilla-esr31/toolkit/locales/en-US/\
chrome/global/intl.properties
[root@dyw219 SOURCES]# grep intl.charset.default mozilla-esr31/toolkit/
    locales/en-US/chrome/global/intl.properties
# LOCALIZATION NOTE (intl.charset.detector, intl.charset.default, intl.
    charsetmenu.browser.static, intl.charsetmenu.mailedit):
intl.charset.detector=Zh_TW
intl.charsetmenu.browser.static=UTF-8,ISO-8859-1

[dywang@dywH SOURCES]$ vim mozilla-esr31/toolkit/locales/en-US/\
chrome/global-platform/unix/intl.properties
[dywang@dywH SOURCES]$ grep charset mozilla-esr31/toolkit/\
locales/en-US/chrome/global-platform/unix/intl.properties
intl.charset.default=UTF-8
```

12. 修改 x-western 及 zh-TW 兩種語系預設的字型大小。

```
[dywang@dywH SOURCES]$ vim mozilla-esr31/modules/libpref/src/init/all.js
[dywang@dywH SOURCES]$ egrep 'font.size.*(x\-western|zh\-TW)' \
mozilla-esr31/modules/libpref/src/init/all.js
pref("font.size.variable.x-western", 15);
pref("font.size.fixed.x-western", 14);
pref("font.size.variable.zh-TW", 15);
pref("font.size.fixed.zh-TW", 15);
pref("font.size.variable.x-western", 15);
pref("font.size.fixed.x-western", 14);
pref("font.size.variable.zh-TW", 15);
pref("font.size.fixed.zh-TW", 15);
pref("font.size.variable.x-western", 15);
pref("font.size.fixed.x-western", 14);
pref("font.size.variable.zh-TW", 15);
pref("font.size.fixed.zh-TW", 15);
pref("font.size.variable.x-western", 15);
pref("font.size.fixed.x-western", 14);
pref("font.size.variable.zh-TW", 15);
pref("font.size.fixed.zh-TW", 15);
```

13. 預設等寬字 monospace，實際使用時不會等寬，故修改成 DejaVu Sans Mono。

```
[dywang@dywH SOURCES]$ vim mozilla-esr31/modules/libpref/src/init/all.js
[dywang@dywH SOURCES]$ egrep 'font.name.monospace.*(x\-western|zh\-TW)'
    \
mozilla-esr31/modules/libpref/src/init/all.js
pref("font.name.monospace.x-western", "DejaVu Sans Mono");
pref("font.name.monospace.zh-TW", "DejaVu Sans Mono");
```

```
pref("font.name.monospace.x-western", "DejaVu Sans Mono");
pref("font.name.monospace.zh-TW", "DejaVu Sans Mono");
pref("font.name.monospace.x-western", "DejaVu Sans Mono");
pref("font.name.monospace.zh-TW", "DejaVu Sans Mono");
pref("font.name.monospace.x-western", "DejaVu Sans Mono");
pref("font.name.monospace.zh-TW", "DejaVu Sans Mono");
pref("font.name.monospace.x-western", "DejaVu Sans Mono");
```

14. 重新打包壓縮 mozilla-esr31 目錄。

```
[dywang@dywH SOURCES]$ tar jcvf firefox-31.1.0esr.source.tar.bz2 mozilla
    -esr31
```

15. 建立 RPM 二進位檔，出現相依套件問題，不同的建立環境缺的套件不會相同，必須把缺的套件都安裝起來。

```
[dywang@dywH SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
    SPECS/firefox.spec
Building target platforms: x86_64
Building for target x86_64
Building target platforms: x86_64
Building for target x86_64
error: Failed build dependencies:
    libvpx-devel >= 1.3.0 is needed by firefox-31.1.0-5.el6.dyw.x86_64
```

16. 安裝 firefox 開發相依套件。

```
[root@dyw219 centos6]# yum install libvpx-devel
```

17. 再同時建立 RPM 及 SRPM 二進位檔字，firefox RPM 建立要 1 小時以上，要耐心等候。成功建立的訊息最後幾行，看到產生 firefox firefox-debuginfo 二個 RPM 檔及一個 firefox SRPM 檔。

```
[dywang@dywH SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
    SPECS/firefox.spec
...................
BUILDROOT/firefox-31.1.0-5.el6.dyw.x86_64
Wrote: /home/dywang/rpmbuild/SRPMS/firefox-31.1.0-5.el6.dyw.src.rpm
Wrote: /home/dywang/rpmbuild/RPMS/x86_64/firefox-31.1.0-5.el6.dyw.x86_64
    .rpm
Wrote: /home/dywang/rpmbuild/RPMS/x86_64/firefox-debuginfo-31.1.0-5.el6.
    dyw.x86_64.rpm
```

```
Executing(%clean): /bin/sh -e /var/tmp/rpm-tmp.reBrVd
+ umask 022
+ cd /home/dywang/rpmbuild/BUILD
+ cd firefox-31.1.0
+ /bin/rm -rf /home/dywang/rpmbuild/BUILDROOT/firefox-31.1.0-5.el6.dyw.
    x86_64
+ exit 0
```

18. 複製到 repo 套件庫。

```
[dywang@dywH SOURCES]$ sudo cp ../RPMS/x86_64/firefox-31-1.0-5* /var/ftp
    /pub/centos6/crtPackages
```

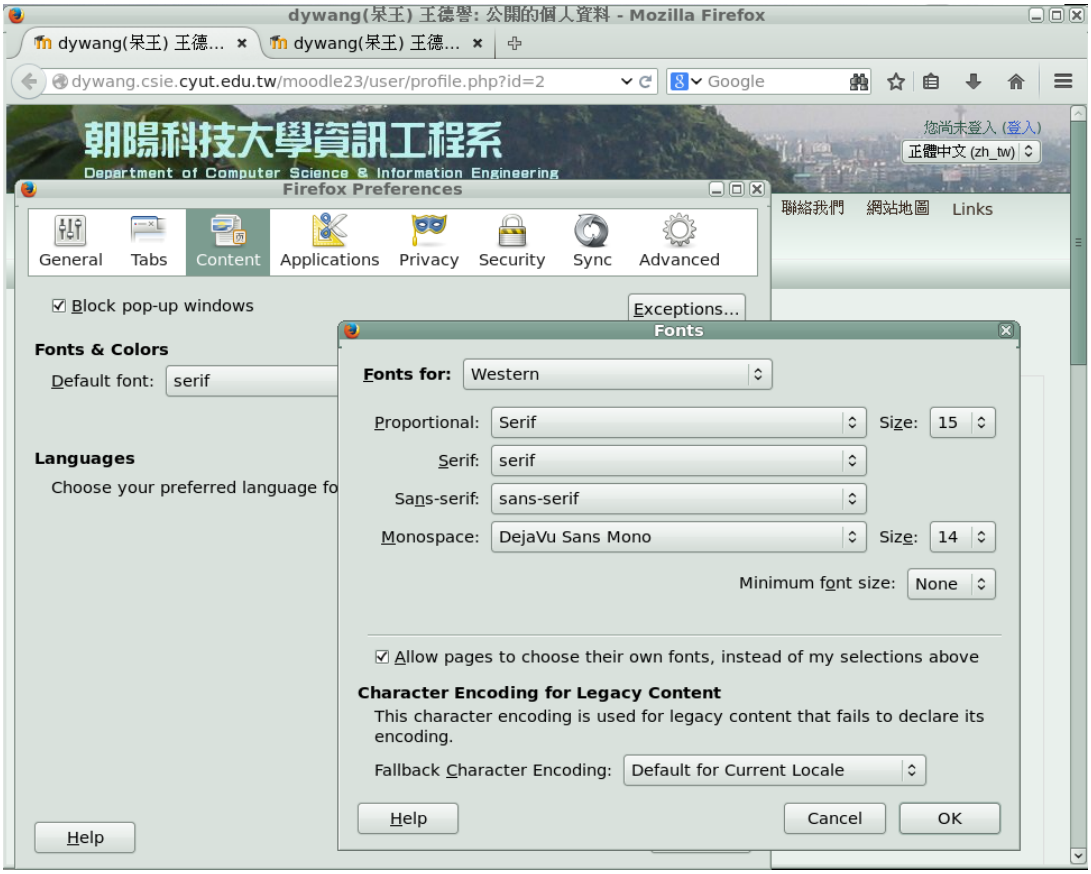
19. 以 root 身份重新建立 repo 資料庫，repogroup.sh 爲自行撰寫的腳本。

```
[root@dywH Packages]$ repogroup.sh
[root@dywH Packages]# repogroup.sh
1888/1888 - Packages/libreoffice/libreoffice-ure-3.4.5.2-16.1.el6_3.
    x86_64.rpm
Saving Primary metadata
Saving file lists metadata
Saving other metadata
Loaded plugins: fastestmirror, refresh-packagekit
Cleaning up Everything
```

20. 安裝 firefox。

```
[dywang@dywH ~]$ sudo yum install firefox
```

21. 安裝後第一次啓動 firefox，出現個人首頁，且預設字型大小及型式已符合個人期待。



18.12 firefox-38.0.1 套件實例

1. 緣由：firefox v31 不支援 google hangouts。

2. 下載 SRPM 套件

```
[dywang@dywH ~]$ cd rpmbuild
[dywang@dywH rpmbuild]$ wget ftp://ftp.pbone.net/mirror/ftp.redhat.com/
    pub\
/redhat/linux/enterprise/6Client/en/os/SRPMS/firefox-38.0.1-1.el6_6.src.
    rpm
```

3. 安裝 SRPM 套件

```
[dywang@dywH rpmbuild]$ rpm -ivh firefox-38.0.1-1.el6_6.src.rpm
```

4. 查看安裝的所有檔案。

```
[dywang@dywH SOURCES]$ rpm -qpl ../firefox-38.0.1-1.el6_6.src.rpm
warning: ../firefox-38.0.1-1.el6_6.src.rpm: \
```

```
Header V3 RSA/SHA256 Signature, key ID fd431d51: NOKEY
Python-2.7.8.tgz
aarch64-fix-skia.patch
build-no-format.patch
build-nspr-prbool.patch
find-external-requires
firefox-38.0.1esr.source.tar.bz2
firefox-debug.patch
firefox-default.patch
firefox-duckduckgo.patch
firefox-enable-addons.patch
firefox-enable-plugins.patch
firefox-install-dir.patch
firefox-langpacks-38.0.1esr-20150515.tar.bz2
firefox-mozconfig
firefox-mozconfig-branded
firefox-nss-3.18.0.patch
firefox-nss-build.patch
firefox-ppc64le.patch
firefox-redhat-default-prefs.js
firefox.1
firefox.desktop
firefox.sh.in
firefox.spec
gcc48-4.8.2-15.el6.src.rpm
mozilla-1005535.patch
mozilla-1152515.patch
mozilla-api-key
rhbz-1173156.patch
rhbz-966424.patch
xulrunner-24.0-jemalloc-ppc.patch
xulrunner-nspr-version.patch
```

5. 查看程式主要的打包壓縮檔。

```
[dywang@dywH SOURCES]$ ls firefox-38.0.1esr.source.tar.bz2
firefox-38.0.1esr.source.tar.bz2
```

6. 解壓縮原始碼 tarball，產生 mozilla-esr38 目錄，存放原始碼。

```
[dywang@dywH SOURCES]$ tar jxvf firefox-38.0.1esr.source.tar.bz2
```

7. 至 mozilla-esr38 目錄，查看檔案。

```
[dywang@dywH SOURCES]$ ls mozilla-esr38
accessible    db           Makefile.in          README.txt
```

```
aclocal.m4      docshell      media                 security
addon-sdk       dom           memory                services
Android.mk      editor        mfbt                  startupcache
AUTHORS         embedding     mobile                storage
b2g             extensions    modules               testing
browser         gfx           moz.build             toolkit
build           GNUmakefile   mozglue               tools
caps            hal           mozilla-config.h.in   uriloader
chrome          image         netwerk               view
client.mk       intl          nsprpub               webapprt
client.py       ipc           other-licenses        widget
CLOBBER         js            parser                xpcom
config          layout        probes                xpfe
configure       LEGAL         profile               xulrunner
configure.in    LICENSE       python
content         mach          rdf
```

8. 切換到暫存目錄，不安裝 rpm 檔下抽取 rpm 檔，做爲修改前後之比較。

```
[dywang@dywH SOURCES]$ cd ../tmp/
[dywang@dywH tmp]$ rpm2cpio ../firefox-38.0.1-1.el6_6.src.rpm | cpio -
    idmv
Python-2.7.8.tgz
aarch64-fix-skia.patch
build-no-format.patch
build-nspr-prbool.patch
find-external-requires
firefox-38.0.1esr.source.tar.bz2
firefox-debug.patch
firefox-default.patch
firefox-duckduckgo.patch
firefox-enable-addons.patch
firefox-enable-plugins.patch
firefox-install-dir.patch
firefox-langpacks-38.0.1esr-20150515.tar.bz2
firefox-mozconfig
firefox-mozconfig-branded
firefox-nss-3.18.0.patch
firefox-nss-build.patch
firefox-ppc64le.patch
firefox-redhat-default-prefs.js
firefox.1
firefox.desktop
firefox.sh.in
firefox.spec
gcc48-4.8.2-15.el6.src.rpm
mozilla-1005535.patch
mozilla-1152515.patch
mozilla-api-key
rhbz-1173156.patch
rhbz-966424.patch
xulrunner-24.0-jemalloc-ppc.patch
```

```
xulrunner-nspr-version.patch
655151 blocks
```

9. 暫存目錄下解開 firefox-38.0.1esr.source.tar.bz2。

```
[dywang@dywH tmp]$ tar jxvf firefox-38.0.1esr.source.tar.bz2
```

10. 修改 RPM spec 規格檔，版本加入 dyw。

```
[dywang@dywH SOURCES]$ vim ../SPECS/firefox.spec
[dywang@dywH SOURCES]$ diff -uN ../tmp/firefox.spec ../SPECS/firefox.
    spec
--- ../tmp/firefox.spec 2015-05-15 16:11:42.000000000 +0800
+++ ../SPECS/firefox.spec   2015-09-17 21:58:19.939319845 +0800
@@ -53,7 +53,7 @@
 Summary:        Mozilla Firefox Web browser
 Name:           firefox
 Version:        38.0.1
-Release:        1%{?prever}%{?dist}
+Release:        1%{?prever}%{?dist}.dyw
 URL:            http://www.mozilla.org/projects/firefox/
 License:        MPLv1.1 or GPLv2+ or LGPLv2+
 Group:          Applications/Internet
```

11. 程式修改前後檔案比較。

```
[dywang@dywssd SOURCES]$ diff -qr ../tmp/mozilla-esr38 mozilla-esr38
Files ../tmp/mozilla-esr38/browser/components/preferences/fonts.xul \
and mozilla-esr38/browser/components/preferences/fonts.xul differ
Files ../tmp/mozilla-esr38/browser/locales/all-locales \
and mozilla-esr38/browser/locales/all-locales differ
Files ../tmp/mozilla-esr38/dom/encoding/FallbackEncoding.cpp \
and mozilla-esr38/dom/encoding/FallbackEncoding.cpp differ
Files ../tmp/mozilla-esr38/extensions/universalchardet/tests/
    CharsetDetectionTests.js \
and mozilla-esr38/extensions/universalchardet/tests/
    CharsetDetectionTests.js differ
Files ../tmp/mozilla-esr38/intl/locale/unix/nsDateTimeFormatUnix.cpp \
and mozilla-esr38/intl/locale/unix/nsDateTimeFormatUnix.cpp differ
Files ../tmp/mozilla-esr38/modules/libpref/init/all.js \
and mozilla-esr38/modules/libpref/init/all.js differ
Files ../tmp/mozilla-esr38/toolkit/locales/all-locales \
and mozilla-esr38/toolkit/locales/all-locales differ
Files ../tmp/mozilla-esr38/toolkit/locales/en-US/chrome/global/intl.
    properties \
and mozilla-esr38/toolkit/locales/en-US/chrome/global/intl.properties
    differ
```

```
Files ../tmp/mozilla-esr38/toolkit/locales/en-US/chrome/global-platform/
    unix/intl.properties \
and mozilla-esr38/toolkit/locales/en-US/chrome/global-platform/unix/intl
    .properties differ
```

12. 修改其他編碼爲 UTF-8。

```
[dywang@dywssd SOURCES]$ diff -uN ../tmp/mozilla-esr38/browser/
    components/preferences/fonts.xul \
mozilla-esr38/browser/components/preferences/fonts.xul
--- ../tmp/mozilla-esr38/browser/components/preferences/fonts.xul
    2015-05-15 01:39:50.000000000 +0800
+++ mozilla-esr38/browser/components/preferences/fonts.xul  2015-10-21
    15:50:04.227835597 +0800
@@ -269,7 +269,7 @@
             <menuitem label="&languages.customize.Fallback.thai;"
                       value="windows-874"/>
             <menuitem label="&languages.customize.Fallback.turkish;"
                       value="windows-1254"/>
             <menuitem label="&languages.customize.Fallback.vietnamese;"
                       value="windows-1258"/>
-            <menuitem label="&languages.customize.Fallback.other;"
          value="windows-1252"/>
+            <menuitem label="&languages.customize.Fallback.other;"
          value="UTF-8"/>
           </menupopup>
         </menulist>
       </hbox>
```

13. 增加瀏覽器語系 en-US。

```
[dywang@dywssd SOURCES]$ diff -uN ../tmp/mozilla-esr38/browser/locales/
    all-locales \
mozilla-esr38/browser/locales/all-locales
--- ../tmp/mozilla-esr38/browser/locales/all-locales    2015-05-15
    01:39:52.000000000 +0800
+++ mozilla-esr38/browser/locales/all-locales   2015-09-18
    14:11:43.000000000 +0800
@@ -18,6 +18,7 @@
 de
 dsb
 el
+en-US
 en-GB
 en-ZA
 eo
```

14. 當找不到編碼時預設使用 UTF-8。

```
[dywang@dywssd SOURCES]$ diff -uN ../tmp/mozilla-esr38/dom/encoding/
    FallbackEncoding.cpp \
mozilla-esr38/dom/encoding/FallbackEncoding.cpp
--- ../tmp/mozilla-esr38/dom/encoding/FallbackEncoding.cpp  2015-05-15
    01:39:57.000000000 +0800
+++ mozilla-esr38/dom/encoding/FallbackEncoding.cpp 2015-09-18
    14:56:54.000000000 +0800
@@ -95,7 +95,7 @@

   if (NS_FAILED(nsUConvPropertySearch::SearchPropertyValue(
       localesFallbacks, ArrayLength(localesFallbacks), locale,
           mFallback))) {
-    mFallback.AssignLiteral("windows-1252");
+    mFallback.AssignLiteral("UTF-8");
   }

   aFallback = mFallback;
@@ -160,7 +160,7 @@
 {
   if (NS_FAILED(nsUConvPropertySearch::SearchPropertyValue(
       domainsFallbacks, ArrayLength(domainsFallbacks), aTLD, aFallback)
           )) {
-    aFallback.AssignLiteral("windows-1252");
+    aFallback.AssignLiteral("UTF-8");
   }
 }
```

15. 預設使用 UTF-8 編碼。

```
[dywang@dywssd SOURCES]$ diff -uN ../tmp/mozilla-esr38/extensions/
    universalchardet/tests/\
CharsetDetectionTests.js mozilla-esr38/extensions/universalchardet/tests
    /CharsetDetectionTests.js
--- ../tmp/mozilla-esr38/extensions/universalchardet/tests/
    CharsetDetectionTests.js 2015-05-15 01:40:04.000000000 +0800
+++ mozilla-esr38/extensions/universalchardet/tests/
    CharsetDetectionTests.js    2015-09-18 16:39:36.000000000 +0800
@@ -47,7 +47,7 @@
     if (gExpectedCharset == "default") {
         // No point trying to be generic here, because we have plenty
             of other
         // unit tests that fail if run using a non-windows-1252 locale.
-        gExpectedCharset = "windows-1252";
+        gExpectedCharset = "UTF-8";
     }

     // Get the local directory. This needs to be a file: URI because
         chrome:
```

16. unix 系統預設使用 UTF-8 編碼。

```
[dywang@dywssd SOURCES]$ diff -uN ../tmp/mozilla-esr38/intl/locale/unix/
    nsDateTimeFormatUnix.cpp \
mozilla-esr38/intl/locale/unix/nsDateTimeFormatUnix.cpp
--- ../tmp/mozilla-esr38/intl/locale/unix/nsDateTimeFormatUnix.cpp
    2015-05-15 01:39:52.000000000 +0800
+++ mozilla-esr38/intl/locale/unix/nsDateTimeFormatUnix.cpp 2015-09-18
    15:15:39.000000000 +0800
@@ -45,7 +45,7 @@
     }
   }

-  mCharset.AssignLiteral("windows-1252");
+  mCharset.AssignLiteral("UTF-8");
   mPlatformLocale.AssignLiteral("en_US");

   // get locale name string, use app default if no locale specified
```

17. 預設等寬字 monospace，實際使用時不會等寬，故修改成 DejaVu Sans Mono，並修改預設字型大小等寬字爲 14，非等寬字爲 16。設定爲 15 時 webmail squirrelmail 在某狀況會背景全黑

```
[dywang@dywssd SOURCES]$ diff -uN ../tmp/mozilla-esr38/modules/libpref/
    init/all.js mozilla-esr38/modules/libpref/init/all.js
--- ../tmp/mozilla-esr38/modules/libpref/init/all.js    2015-05-15
    01:40:01.000000000 +0800
+++ mozilla-esr38/modules/libpref/init/all.js   2015-10-21
    15:47:57.233835646 +0800
@@ -550,9 +550,9 @@
 pref("apz.zoom_animation_duration_ms", 250);

 #ifdef XP_MACOSX
-pref("apz.fling_repaint_interval", 16);
-pref("apz.smooth_scroll_repaint_interval", 16);
-pref("apz.pan_repaint_interval", 16);
+pref("apz.fling_repaint_interval", 15);
+pref("apz.smooth_scroll_repaint_interval", 15);
+pref("apz.pan_repaint_interval", 15);
 pref("apz.x_skate_size_multiplier", "2.5");
 pref("apz.y_skate_size_multiplier", "3.5");
 #else
@@ -1110,7 +1110,7 @@
 // network reads and on wifi to mitigate 802.11 Power Save Polling
     delays
 pref("network.tickle-wifi.enabled", false);
 pref("network.tickle-wifi.duration", 400);
-pref("network.tickle-wifi.delay", 16);
+pref("network.tickle-wifi.delay", 15);

 // Turn off interprocess security checks. Needed to run xpcshell tests.
```

```
 pref("network.disable.ipc.security", false);
@@ -1718,7 +1718,7 @@
 // fallback charset list for Unicode conversion (converting from
     Unicode)
 // currently used for mail send only to handle symbol characters (e.g
     Euro, trademark, smartquotes)
 // for ISO-8859-1
-pref("intl.fallbackCharsetList.ISO-8859-1", "windows-1252");
+pref("intl.fallbackCharsetList.ISO-8859-1", "UTF-8");
 pref("font.language.group",                 "chrome://global/locale/
     intl.properties");

 // these locales have right-to-left UI
@@ -2407,142 +2407,142 @@
 pref("font.default.ar", "sans-serif");
 pref("font.minimum-size.ar", 0);
 pref("font.size.variable.ar", 16);
-pref("font.size.fixed.ar", 13);
+pref("font.size.fixed.ar", 14);

 pref("font.default.el", "serif");
 pref("font.minimum-size.el", 0);
 pref("font.size.variable.el", 16);
-pref("font.size.fixed.el", 13);
+pref("font.size.fixed.el", 14);

 pref("font.default.he", "sans-serif");
 pref("font.minimum-size.he", 0);
 pref("font.size.variable.he", 16);
-pref("font.size.fixed.he", 13);
+pref("font.size.fixed.he", 14);

 pref("font.default.ja", "sans-serif");
 pref("font.minimum-size.ja", 0);
 pref("font.size.variable.ja", 16);
-pref("font.size.fixed.ja", 16);
+pref("font.size.fixed.ja", 14);

 pref("font.default.ko", "sans-serif");
 pref("font.minimum-size.ko", 0);
 pref("font.size.variable.ko", 16);
-pref("font.size.fixed.ko", 16);
+pref("font.size.fixed.ko", 14);

 pref("font.default.th", "serif");
 pref("font.minimum-size.th", 0);
 pref("font.size.variable.th", 16);
-pref("font.size.fixed.th", 13);
+pref("font.size.fixed.th", 14);

 pref("font.default.x-cyrillic", "serif");
 pref("font.minimum-size.x-cyrillic", 0);
 pref("font.size.variable.x-cyrillic", 16);
-pref("font.size.fixed.x-cyrillic", 13);
```

```
+pref("font.size.fixed.x-cyrillic", 14);
77
 pref("font.default.x-devanagari", "serif");
79 pref("font.minimum-size.x-devanagari", 0);
 pref("font.size.variable.x-devanagari", 16);
81 -pref("font.size.fixed.x-devanagari", 13);
+pref("font.size.fixed.x-devanagari", 14);
83
 pref("font.default.x-tamil", "serif");
85 pref("font.minimum-size.x-tamil", 0);
 pref("font.size.variable.x-tamil", 16);
87 -pref("font.size.fixed.x-tamil", 13);
+pref("font.size.fixed.x-tamil", 14);
89
 pref("font.default.x-armn", "serif");
91 pref("font.minimum-size.x-armn", 0);
 pref("font.size.variable.x-armn", 16);
93 -pref("font.size.fixed.x-armn", 13);
+pref("font.size.fixed.x-armn", 14);
95
 pref("font.default.x-beng", "serif");
97 pref("font.minimum-size.x-beng", 0);
 pref("font.size.variable.x-beng", 16);
99 -pref("font.size.fixed.x-beng", 13);
+pref("font.size.fixed.x-beng", 14);
101
 pref("font.default.x-cans", "serif");
103 pref("font.minimum-size.x-cans", 0);
 pref("font.size.variable.x-cans", 16);
105 -pref("font.size.fixed.x-cans", 13);
+pref("font.size.fixed.x-cans", 14);
107
 pref("font.default.x-ethi", "serif");
109 pref("font.minimum-size.x-ethi", 0);
 pref("font.size.variable.x-ethi", 16);
111 -pref("font.size.fixed.x-ethi", 13);
+pref("font.size.fixed.x-ethi", 14);
113
 pref("font.default.x-geor", "serif");
115 pref("font.minimum-size.x-geor", 0);
 pref("font.size.variable.x-geor", 16);
117 -pref("font.size.fixed.x-geor", 13);
+pref("font.size.fixed.x-geor", 14);
119
 pref("font.default.x-gujr", "serif");
121 pref("font.minimum-size.x-gujr", 0);
 pref("font.size.variable.x-gujr", 16);
123 -pref("font.size.fixed.x-gujr", 13);
+pref("font.size.fixed.x-gujr", 14);
125
 pref("font.default.x-guru", "serif");
127 pref("font.minimum-size.x-guru", 0);
 pref("font.size.variable.x-guru", 16);
129 -pref("font.size.fixed.x-guru", 13);
```

```
+pref("font.size.fixed.x-guru", 14);

 pref("font.default.x-khmr", "serif");
 pref("font.minimum-size.x-khmr", 0);
 pref("font.size.variable.x-khmr", 16);
-pref("font.size.fixed.x-khmr", 13);
+pref("font.size.fixed.x-khmr", 14);

 pref("font.default.x-mlym", "serif");
 pref("font.minimum-size.x-mlym", 0);
 pref("font.size.variable.x-mlym", 16);
-pref("font.size.fixed.x-mlym", 13);
+pref("font.size.fixed.x-mlym", 14);

 pref("font.default.x-orya", "serif");
 pref("font.minimum-size.x-orya", 0);
 pref("font.size.variable.x-orya", 16);
-pref("font.size.fixed.x-orya", 13);
+pref("font.size.fixed.x-orya", 14);

 pref("font.default.x-telu", "serif");
 pref("font.minimum-size.x-telu", 0);
 pref("font.size.variable.x-telu", 16);
-pref("font.size.fixed.x-telu", 13);
+pref("font.size.fixed.x-telu", 14);

 pref("font.default.x-knda", "serif");
 pref("font.minimum-size.x-knda", 0);
 pref("font.size.variable.x-knda", 16);
-pref("font.size.fixed.x-knda", 13);
+pref("font.size.fixed.x-knda", 14);

 pref("font.default.x-sinh", "serif");
 pref("font.minimum-size.x-sinh", 0);
 pref("font.size.variable.x-sinh", 16);
-pref("font.size.fixed.x-sinh", 13);
+pref("font.size.fixed.x-sinh", 14);

 pref("font.default.x-tibt", "serif");
 pref("font.minimum-size.x-tibt", 0);
 pref("font.size.variable.x-tibt", 16);
-pref("font.size.fixed.x-tibt", 13);
+pref("font.size.fixed.x-tibt", 14);

 pref("font.default.x-unicode", "serif");
 pref("font.minimum-size.x-unicode", 0);
 pref("font.size.variable.x-unicode", 16);
-pref("font.size.fixed.x-unicode", 13);
+pref("font.size.fixed.x-unicode", 14);

 pref("font.default.x-western", "serif");
 pref("font.minimum-size.x-western", 0);
 pref("font.size.variable.x-western", 16);
-pref("font.size.fixed.x-western", 13);
```

```
+pref("font.size.fixed.x-western", 14);
185
 pref("font.default.zh-CN", "sans-serif");
187 pref("font.minimum-size.zh-CN", 0);
 pref("font.size.variable.zh-CN", 16);
189 -pref("font.size.fixed.zh-CN", 16);
+pref("font.size.fixed.zh-CN", 14);
191
 pref("font.default.zh-HK", "sans-serif");
193 pref("font.minimum-size.zh-HK", 0);
 pref("font.size.variable.zh-HK", 16);
195 -pref("font.size.fixed.zh-HK", 16);
+pref("font.size.fixed.zh-HK", 14);
197
 pref("font.default.zh-TW", "sans-serif");
199 pref("font.minimum-size.zh-TW", 0);
 pref("font.size.variable.zh-TW", 16);
201 -pref("font.size.fixed.zh-TW", 16);
+pref("font.size.fixed.zh-TW", 14);
203
 /*
205  * A value greater than zero enables font size inflation for
@@ -2727,7 +2727,7 @@
207
 pref("font.name.serif.x-western", "Times New Roman");
209 pref("font.name.sans-serif.x-western", "Arial");
-pref("font.name.monospace.x-western", "Courier New");
211 +pref("font.name.monospace.x-western", "DejaVu Sans Mono");
 pref("font.name.cursive.x-western", "Comic Sans MS");
213
 pref("font.name.serif.zh-CN", "SimSun");
215 @@ -2742,10 +2742,10 @@
 // rendering Latin letters. (bug 88579)
217 pref("font.name.serif.zh-TW", "Times New Roman");
 pref("font.name.sans-serif.zh-TW", "Arial");
219 -pref("font.name.monospace.zh-TW", "MingLiU");
+pref("font.name.monospace.zh-TW", "DejaVu Sans Mono");
221 pref("font.name-list.serif.zh-TW", "PMingLiu, MingLiU, MingLiU-ExtB");
 pref("font.name-list.sans-serif.zh-TW", "PMingLiU, MingLiU, MingLiU-
     ExtB");
223 -pref("font.name-list.monospace.zh-TW", "MingLiU, MingLiU-ExtB");
+pref("font.name-list.monospace.zh-TW", "DejaVu Sans Mono");
225
 // hkscsm3u.ttf (HKSCS-2001) :  http://www.microsoft.com/hk/hkscs
227 // Hong Kong users have the same demand about glyphs for Latin letters
     (bug 88579)
@@ -3224,12 +3224,12 @@
229
 pref("font.name.serif.x-western", "Times");
231 pref("font.name.sans-serif.x-western", "Helvetica");
-pref("font.name.monospace.x-western", "Courier");
233 +pref("font.name.monospace.x-western", "DejaVu Sans Mono");
 pref("font.name.cursive.x-western", "Apple Chancery");
235 pref("font.name.fantasy.x-western", "Papyrus");
```

```
 pref("font.name-list.serif.x-western", "Times,Times New Roman");
237  pref("font.name-list.sans-serif.x-western", "Helvetica,Arial");
-pref("font.name-list.monospace.x-western", "Courier,Courier New");
239 +pref("font.name-list.monospace.x-western", "DejaVu Sans Mono");
 pref("font.name-list.cursive.x-western", "Apple Chancery");
241  pref("font.name-list.fantasy.x-western", "Papyrus");

243 @@ -3242,10 +3242,10 @@

245  pref("font.name.serif.zh-TW", "Times");
 pref("font.name.sans-serif.zh-TW", "Helvetica");
247 -pref("font.name.monospace.zh-TW", "Courier");
+pref("font.name.monospace.zh-TW", "DejaVu Sans Mono");
249  pref("font.name-list.serif.zh-TW", "Times,LiSong Pro,Heiti TC");
 pref("font.name-list.sans-serif.zh-TW", "Helvetica,Heiti TC,LiHei Pro")
     ;
251 -pref("font.name-list.monospace.zh-TW", "Courier,Heiti TC,LiHei Pro");
+pref("font.name-list.monospace.zh-TW", "DejaVu Sans Mono");
253
 pref("font.name.serif.zh-HK", "Times");
255  pref("font.name.sans-serif.zh-HK", "Helvetica");
@@ -3256,9 +3256,9 @@
257
 // XP_MACOSX changes to default font sizes
259  pref("font.minimum-size.th", 10);
-pref("font.size.variable.zh-CN", 15);
261 -pref("font.size.variable.zh-HK", 15);
-pref("font.size.variable.zh-TW", 15);
263 +pref("font.size.variable.zh-CN", 16);
+pref("font.size.variable.zh-HK", 16);
265 +pref("font.size.variable.zh-TW", 16);

267  // Apple's Symbol is Unicode so use it
 pref("font.mathfont-family", "Latin Modern Math, XITS Math, STIX Math,
     Cambria Math, Asana Math, TeX Gyre Bonum Math, TeX Gyre Pagella
     Math, TeX Gyre Termes Math, Neo Euler, Lucida Bright Math,
     MathJax_Main, STIXNonUnicode, STIXSizeOneSym, STIXGeneral, Symbol,
     DejaVu Sans");
269 @@ -3439,17 +3439,17 @@

271  // font names

273 -pref("font.size.fixed.ar", 12);
+pref("font.size.fixed.ar", 14);
275
 pref("font.name.serif.el", "serif");
277  pref("font.name.sans-serif.el", "sans-serif");
 pref("font.name.monospace.el", "monospace");
279 -pref("font.size.fixed.el", 12);
+pref("font.size.fixed.el", 14);
281
 pref("font.name.serif.he", "serif");
283  pref("font.name.sans-serif.he", "sans-serif");
 pref("font.name.monospace.he", "monospace");
```

```
285 -pref("font.size.fixed.he", 12);
    +pref("font.size.fixed.he", 14);
287
     pref("font.name.serif.ja", "serif");
289  pref("font.name.sans-serif.ja", "sans-serif");
    @@ -3461,23 +3461,23 @@
291
     pref("font.name.serif.th", "serif");
293  pref("font.name.sans-serif.th", "sans-serif");
    -pref("font.minimum-size.th", 13);
295 +pref("font.minimum-size.th", 15);
     pref("font.name.monospace.th", "monospace");
297
     pref("font.name.serif.x-cyrillic", "serif");
299  pref("font.name.sans-serif.x-cyrillic", "sans-serif");
     pref("font.name.monospace.x-cyrillic", "monospace");
301 -pref("font.size.fixed.x-cyrillic", 12);
    +pref("font.size.fixed.x-cyrillic", 14);
303
     pref("font.name.serif.x-unicode", "serif");
305  pref("font.name.sans-serif.x-unicode", "sans-serif");
     pref("font.name.monospace.x-unicode", "monospace");
307 -pref("font.size.fixed.x-unicode", 12);
    +pref("font.size.fixed.x-unicode", 14);
309
     pref("font.name.serif.x-western", "serif");
311  pref("font.name.sans-serif.x-western", "sans-serif");
    -pref("font.name.monospace.x-western", "monospace");
313 -pref("font.size.fixed.x-western", 12);
    +pref("font.name.monospace.x-western", "DejaVu Sans Mono");
315 +pref("font.size.fixed.x-western", 14);

317  pref("font.name.serif.zh-CN", "serif");
     pref("font.name.sans-serif.zh-CN", "sans-serif");
319 @@ -3523,21 +3523,21 @@

321  #if defined(ANDROID) || defined(MOZ_B2G)

323 -pref("font.size.fixed.ar", 12);
    +pref("font.size.fixed.ar", 14);
325
     pref("font.default.el", "sans-serif");
327 -pref("font.size.fixed.el", 12);
    +pref("font.size.fixed.el", 14);
329
    -pref("font.size.fixed.he", 12);
331 +pref("font.size.fixed.he", 14);

333  pref("font.default.x-cyrillic", "sans-serif");
    -pref("font.size.fixed.x-cyrillic", 12);
335 +pref("font.size.fixed.x-cyrillic", 14);

337  pref("font.default.x-unicode", "sans-serif");
    -pref("font.size.fixed.x-unicode", 12);
```

```
339 +pref("font.size.fixed.x-unicode", 14);

341  pref("font.default.x-western", "sans-serif");
    -pref("font.size.fixed.x-western", 12);
343 +pref("font.size.fixed.x-western", 14);

345  # ANDROID || MOZ_B2G
     #endif
347 @@ -3583,7 +3583,7 @@

349  pref("font.name.serif.x-western", "Charis SIL Compact");
     pref("font.name.sans-serif.x-western", "Fira Sans");
351 -pref("font.name.monospace.x-western", "Fira Mono");
    +pref("font.name.monospace.x-western", "DejaVu Sans Mono");
353
     pref("font.name.serif.zh-CN", "Charis SIL Compact");
355  pref("font.name.sans-serif.zh-CN", "Fira Sans");
    @@ -3597,7 +3597,7 @@
357
     pref("font.name.serif.zh-TW", "Charis SIL Compact");
359  pref("font.name.sans-serif.zh-TW", "Fira Sans");
    -pref("font.name.monospace.zh-TW", "Fira Mono");
361 +pref("font.name.monospace.zh-TW", "DejaVu Sans Mono");
     pref("font.name-list.sans-serif.zh-TW", "Fira Sans,Droid Sans Fallback
         ");
363
     #elif defined(ANDROID)
365 @@ -3648,7 +3648,7 @@

367  pref("font.name.serif.x-western", "Charis SIL Compact");
     pref("font.name.sans-serif.x-western", "Clear Sans");
369 -pref("font.name.monospace.x-western", "Droid Sans Mono");
    +pref("font.name.monospace.x-western", "DejaVu Sans Mono");
371  pref("font.name-list.serif.x-western", "Droid Serif");
     pref("font.name-list.sans-serif.x-western", "Clear Sans, Roboto, Droid
         Sans");
373
    @@ -3668,10 +3668,10 @@
375
     pref("font.name.serif.zh-TW", "Charis SIL Compact");
377  pref("font.name.sans-serif.zh-TW", "Clear Sans");
    -pref("font.name.monospace.zh-TW", "Droid Sans Mono");
379 +pref("font.name.monospace.zh-TW", "DejaVu Sans Mono");
     pref("font.name-list.serif.zh-TW", "Droid Serif, Droid Sans Fallback");
381  pref("font.name-list.sans-serif.zh-TW", "Roboto, Droid Sans, Noto Sans
         TC, Noto Sans SC, Droid Sans Fallback");
    -pref("font.name-list.monospace.zh-TW", "Droid Sans Fallback");
383 +pref("font.name-list.monospace.zh-TW", "DejaVu Sans Mono");

385  #endif
```

18. toolkit 語系增加 en-US。

```
[dywang@dywssd SOURCES]$ diff -uN ../tmp/mozilla-esr38/toolkit/locales/
    all-locales \
mozilla-esr38/toolkit/locales/all-locales
--- ../tmp/mozilla-esr38/toolkit/locales/all-locales    2015-05-15
    01:40:03.000000000 +0800
+++ mozilla-esr38/toolkit/locales/all-locales   2015-09-18
    14:17:24.000000000 +0800
@@ -12,3 +12,4 @@
 ro
 sv-SE
 ru
+en-US
```

19. 增加 zh-TW 可用語系。

```
[dywang@dywssd SOURCES]$ diff -uN ../tmp/mozilla-esr38/toolkit/locales/
    en-US/chrome\
/global/intl.properties mozilla-esr38/toolkit/locales/en-US/chrome/
    global/intl.properties
--- ../tmp/mozilla-esr38/toolkit/locales/en-US/chrome/global/intl.
    properties    2015-05-15 01:40:03.000000000 +0800
+++ mozilla-esr38/toolkit/locales/en-US/chrome/global/intl.properties
    2015-09-18 15:12:24.000000000 +0800
@@ -30,7 +30,7 @@
 # British English in their list, since those languages are commonly
     spoken in
 # the same area as Breton:
 # intl.accept_languages=br, fr-FR, fr, en-GB, en
-intl.accept_languages=en-US, en
+intl.accept_languages=en-US, en, zh-TW

 # LOCALIZATION NOTE (font.language.group):
 # This preference controls the initial setting of the language drop-
     down menu
```

20. 系統預設使用 UTF-8 編碼。

```
[dywang@dywssd SOURCES]$ diff -uN ../tmp/mozilla-esr38/toolkit/locales/
    en-US/chrome \
/global-platform/unix/intl.properties \
mozilla-esr38/toolkit/locales/en-US/chrome/global-platform/unix/intl.
    properties
--- ../tmp/mozilla-esr38/toolkit/locales/en-US/chrome/global-platform/
    unix/intl.properties\
    2015-05-15 01:40:03.000000000 +0800
+++ mozilla-esr38/toolkit/locales/en-US/chrome/global-platform/unix/intl
    .properties\
    2015-09-18 14:20:57.000000000 +0800
```

```
@@ -4,4 +4,5 @@

 # LOCALIZATION NOTE (intl.ellipsis): Use the unicode ellipsis char, \
    u2026,
 # or use "..." if \u2026 doesn't suit traditions in your locale.
-intl.ellipsis=…
+intl.charset.default=UTF-8
```

21. 修改預設首頁到個人網頁。

```
[dywang@dywH SOURCES]$ vim firefox-centos-default-prefs.js
[dywang@dywH SOURCES]$ diff -uN ../tmp/firefox-redhat-default-prefs.js
   firefox-redhat-default-prefs.js
--- ../tmp/firefox-redhat-default-prefs.js  2015-05-15
   16:11:23.000000000 +0800
+++ firefox-redhat-default-prefs.js 2015-09-17 22:02:01.938319573 +0800
@@ -14,10 +14,10 @@
 pref("dom.ipc.plugins.enabled.nswrapper*",  false);
 pref("network.manage-offline-status",       true);
 pref("toolkit.networkmanager.disable",      false);
-pref("browser.startup.homepage",            "data:text/plain,browser.
   startup.homepage=file:///usr/share/doc/HTML/index.html");
+pref("browser.startup.homepage",            "data:text/plain,browser.
   startup.homepage=http://dywang.csie.cyut.edu.tw");
 pref("toolkit.storage.synchronous",         0);
-pref("startup.homepage_override_url",       "http://www.redhat.com");
-pref("startup.homepage_welcome_url",        "http://www.redhat.com");
+pref("startup.homepage_override_url",       "http://dywang.csie.cyut.
   edu.tw");
+pref("startup.homepage_welcome_url",        "http://dywang.csie.cyut.
   edu.tw");
 /* Workaround for rhbz#1134876 */
 pref("javascript.options.baselinejit",      false);
 pref("extensions.shownSelectionUI",         true);
```

22. 重新打包壓縮 mozilla-esr31 目錄。

```
[dywang@dywH SOURCES]$ tar jcvf firefox-38.0.1esr.source.tar.bz2 mozilla
   -esr38
```

23. 建立 RPM 二進位檔，出現相依套件問題，不同的建立環境缺的套件不會相同，必須把缺的套件都安裝起來。

```
[dywang@dywH SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
   SPECS/firefox.spec
Building target platforms: x86_64
```

```
Building for target x86_64
error: Failed build dependencies:
    nspr-devel >= 4.10.8 is needed by firefox-38.1.0-1.el6.dyw.x86_64
    nss-devel >= 3.18.0 is needed by firefox-38.1.0-1.el6.dyw.x86_64
    pulseaudio-libs-devel is needed by firefox-38.1.0-1.el6.dyw.x86_64
    glibc-static is needed by firefox-38.1.0-1.el6.dyw.x86_64
    dejagnu is needed by firefox-38.1.0-1.el6.dyw.x86_64
    bison is needed by firefox-38.1.0-1.el6.dyw.x86_64
    flex is needed by firefox-38.1.0-1.el6.dyw.x86_64
    texinfo is needed by firefox-38.1.0-1.el6.dyw.x86_64
    sharutils is needed by firefox-38.1.0-1.el6.dyw.x86_64
    elfutils-devel >= 0.147 is needed by firefox-38.1.0-1.el6.dyw.x86_64
    elfutils-libelf-devel >= 0.147 is needed by firefox-38.1.0-1.el6.dyw
        .x86_64
    /lib/libc.so.6 is needed by firefox-38.1.0-1.el6.dyw.x86_64
    /usr/lib/libc.so is needed by firefox-38.1.0-1.el6.dyw.x86_64
    gmp-devel >= 4.1.2-8 is needed by firefox-38.1.0-1.el6.dyw.x86_64
    mpfr-devel >= 2.2.1 is needed by firefox-38.1.0-1.el6.dyw.x86_64
```

24. 安裝 firefox 開發相依套件。

```
[root@dywH ~]# yum install pulseaudio-libs-devel glibc-static dejagnu \
bison flex texinfo sharutils elfutils-devel elfutils-libelf-devel \
gmp-devel mpfr-devel glibc-devel-2.12-1.166.el6.i686
```

25. 再同時建立 RPM 及 SRPM 二進位檔字，firefox RPM 建立要 1 小時以上，要耐心等候。成功建立的訊息最後幾行，看到產生 firefox firefox-debuginfo 二個 RPM 檔及一個 firefox SRPM 檔。

```
[dywang@dywH SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
    SPECS/firefox.spec
...................
Wrote: /home/dywang/rpmbuild/SRPMS/firefox-38.0.1-1.el6.dyw.src.rpm
Wrote: /home/dywang/rpmbuild/RPMS/x86_64/firefox-38.0.1-1.el6.dyw.x86_64
    .rpm
Wrote: /home/dywang/rpmbuild/RPMS/x86_64/firefox-debuginfo-38.0.1-1.el6.
    dyw.x86_64.rpm
Executing(%clean): /bin/sh -e /var/tmp/rpm-tmp.RLL8rf
+ umask 022
+ cd /home/dywang/rpmbuild/BUILD
+ cd firefox-38.0.1
+ /bin/rm -rf /home/dywang/rpmbuild/BUILDROOT/firefox-38.0.1-1.el6.dyw.
    x86_64
+ exit 0
Executing(--clean): /bin/sh -e /var/tmp/rpm-tmp.wH9adX
+ umask 022
+ cd /home/dywang/rpmbuild/BUILD
+ rm -rf firefox-38.0.1
```

```
+ exit 0
```

18.13 firefox-38.6 套件實例

1. 緣由：firefox v38.0.1 某些網頁會當掉。
2. v38.6 有 firefox hello 視訊 (video+audio)，但沒有文字聊天室。
3. 下載 SRPM 套件

```
[dywang@dywnb ~]$ cd rpmbuild
[dywang@dywnb rpmbuild]$ wget ftp://ftp.pbone.net/mirror/ftp.redhat.com/
    pub\
/redhat/linux/enterprise/6Workstation/en/os/SRPMS/firefox-38.6.1-1.el6_7
    .src.rpm
```

4. 安裝 SRPM 套件

```
[dywang@dywnb rpmbuild]$ rpm -ivh firefox-38.6.1-1.el6_7.src.rpm
```

5. 查看安裝的所有檔案。

```
[dywang@dywnb rpmbuild]$ cd SOURCES/
[dywang@dywnb SOURCES]$ rpm -qpl ../firefox-38.6.1-1.el6_7.src.rpm
warning: ../firefox-38.6.1-1.el6_7.src.rpm: Header V3 RSA/SHA256
    Signature, key ID fd431d51: NOKEY
Python-2.7.8.tgz
aarch64-fix-skia.patch
build-no-format.patch
build-nspr-prbool.patch
find-external-requires
firefox-38.6.1esr.source.tar.bz2
firefox-debug.patch
firefox-default.patch
firefox-duckduckgo.patch
firefox-enable-addons.patch
firefox-enable-plugins.patch
firefox-install-dir.patch
firefox-langpacks-38.6.1esr-20160211.tar.bz2
firefox-mozconfig
firefox-mozconfig-branded
firefox-nss-3.19.1.patch
firefox-nss-build.patch
firefox-ppc64le.patch
```

```
firefox-redhat-default-prefs.js
firefox.1
firefox.desktop
firefox.sh.in
firefox.spec
gcc48-4.8.2-15.el6.src.rpm
mozilla-1005535.patch
mozilla-1152515.patch
mozilla-1204147.patch
mozilla-api-key
rhbz-1173156.patch
rhbz-966424.patch
xulrunner-24.0-jemalloc-ppc.patch
xulrunner-nspr-version.patch
```

6. 查看程式主要的打包壓縮檔。

```
[dywang@dywnb SOURCES]$ ls firefox-38.6.1esr.source.tar.bz2
firefox-38.6.1esr.source.tar.bz2
```

7. 解壓縮原始碼 tarball，產生 mozilla-esr38 目錄，存放原始碼。

```
[dywang@dywnb SOURCES]$ tar jxvf firefox-38.6.1esr.source.tar.bz2
```

8. 至 mozilla-esr38 目錄，查看檔案。

```
[dywang@dywnb SOURCES]$ ls mozilla-esr38
accessible  configure     ipc          mozilla-config.h.in  testing
aclocal.m4  configure.in  js           netwerk              toolkit
addon-sdk   content       layout       nsprpub              tools
Android.mk  db            LEGAL        other-licenses       uriloader
AUTHORS     docshell      LICENSE      parser               view
b2g         dom           mach         probes               webapprt
browser     editor        Makefile.in  profile              widget
build       embedding     media        python               xpcom
caps        extensions    memory       rdf                  xpfe
chrome      gfx           mfbt         README.txt           xulrunner
client.mk   GNUmakefile   mobile       security
client.py   hal           modules      services
CLOBBER     image         moz.build    startupcache
config      intl          mozglue      storage
```

9. 切換到暫存目錄，不安裝 rpm 檔下抽取 rpm 檔，做爲修改前後之比較。

```
[dywang@dywnb SOURCES]$ cd ../tmp/
[dywang@dywnb tmp]$ rpm2cpio ../firefox-38.6.1-1.el6_7.src.rpm | cpio -
    idmv
Python-2.7.8.tgz
aarch64-fix-skia.patch
build-no-format.patch
build-nspr-prbool.patch
find-external-requires
firefox-38.6.1esr.source.tar.bz2
firefox-debug.patch
firefox-default.patch
firefox-duckduckgo.patch
firefox-enable-addons.patch
firefox-enable-plugins.patch
firefox-install-dir.patch
firefox-langpacks-38.6.1esr-20160211.tar.bz2
firefox-mozconfig
firefox-mozconfig-branded
firefox-nss-3.19.1.patch
firefox-nss-build.patch
firefox-ppc64le.patch
firefox-redhat-default-prefs.js
firefox.1
firefox.desktop
firefox.sh.in
firefox.spec
gcc48-4.8.2-15.el6.src.rpm
mozilla-1005535.patch
mozilla-1152515.patch
mozilla-1204147.patch
mozilla-api-key
rhbz-1173156.patch
rhbz-966424.patch
xulrunner-24.0-jemalloc-ppc.patch
xulrunner-nspr-version.patch
656508 blocks
```

10. 暫存目錄下解開 firefox-38.6.1esr.source.tar.bz2。

```
[dywang@dywnb tmp]$ tar jxvf firefox-38.6.1esr.source.tar.bz2
```

11. 修改 RPM spec 規格檔，版本加入 dyw。

```
[dywang@dywnb tmp]$ cd -
/home/dywang/rpmbuild/SOURCES
[dywang@dywnb SOURCES]$ vim ../SPECS/firefox.spec
[dywang@dywnb SOURCES]$ diff -uN ../tmp/firefox.spec ../SPECS/firefox.
    spec
```

```
--- ../tmp/firefox.spec 2016-02-11 16:57:21.000000000 +0800
+++ ../SPECS/firefox.spec   2016-03-10 08:14:36.820241162 +0800
@@ -52,7 +52,7 @@
 Summary:        Mozilla Firefox Web browser
 Name:           firefox
 Version:        38.6.1
-Release:        1%{?prever}%{?dist}
+Release:        1%{?prever}%{?dist}.dyw
 URL:            http://www.mozilla.org/projects/firefox/
 License:        MPLv1.1 or GPLv2+ or LGPLv2+
 Group:          Applications/Internet
```

12. 程式修改前後檔案比較。

```
[dywang@dywssd SOURCES]$ diff -qr ../tmp/mozilla-esr38 mozilla-esr38
Files ../tmp/mozilla-esr38/browser/components/preferences/fonts.xul \
and mozilla-esr38/browser/components/preferences/fonts.xul differ
Files ../tmp/mozilla-esr38/browser/locales/all-locales \
and mozilla-esr38/browser/locales/all-locales differ
Files ../tmp/mozilla-esr38/dom/encoding/FallbackEncoding.cpp \
and mozilla-esr38/dom/encoding/FallbackEncoding.cpp differ
Files ../tmp/mozilla-esr38/extensions/universalchardet/tests/
    CharsetDetectionTests.js \
and mozilla-esr38/extensions/universalchardet/tests/
    CharsetDetectionTests.js differ
Files ../tmp/mozilla-esr38/intl/locale/unix/nsDateTimeFormatUnix.cpp \
and mozilla-esr38/intl/locale/unix/nsDateTimeFormatUnix.cpp differ
Files ../tmp/mozilla-esr38/modules/libpref/init/all.js \
and mozilla-esr38/modules/libpref/init/all.js differ
Files ../tmp/mozilla-esr38/toolkit/locales/all-locales \
and mozilla-esr38/toolkit/locales/all-locales differ
Files ../tmp/mozilla-esr38/toolkit/locales/en-US/chrome/global/intl.
    properties \
and mozilla-esr38/toolkit/locales/en-US/chrome/global/intl.properties
    differ
Files ../tmp/mozilla-esr38/toolkit/locales/en-US/chrome/global-platform/
    unix/intl.properties \
and mozilla-esr38/toolkit/locales/en-US/chrome/global-platform/unix/intl
    .properties differ
```

13. 修改其他編碼爲 UTF-8。

```
[dywang@dywnb SOURCES]$ vim mozilla-esr38/browser/components/preferences
    /fonts.xul
[dywang@dywnb SOURCES]$ diff -uN ../tmp/mozilla-esr38/browser/components
    /preferences/fonts.xul \
> mozilla-esr38/browser/components/preferences/fonts.xul
--- ../tmp/mozilla-esr38/browser/components/preferences/fonts.xul
    2016-02-11 04:58:51.000000000 +0800
```

```
+++ mozilla-esr38/browser/components/preferences/fonts.xul  2016-03-10
    08:17:42.524245316 +0800
@@ -269,7 +269,7 @@
             <menuitem label="&languages.customize.Fallback.thai;"
                       value="windows-874"/>
             <menuitem label="&languages.customize.Fallback.turkish;"
                       value="windows-1254"/>
             <menuitem label="&languages.customize.Fallback.vietnamese;"
                       value="windows-1258"/>
-            <menuitem label="&languages.customize.Fallback.other;"
          value="windows-1252"/>
+            <menuitem label="&languages.customize.Fallback.other;"
          value="UTF-8"/>
           </menupopup>
         </menulist>
       </hbox>
```

14. 增加瀏覽器語系 en-US。

```
[dywang@dywssd SOURCES]$ diff -uN ../tmp/mozilla-esr38/browser/locales/
    all-locales \
mozilla-esr38/browser/locales/all-locales
--- ../tmp/mozilla-esr38/browser/locales/all-locales    2015-05-15
    01:39:52.000000000 +0800
+++ mozilla-esr38/browser/locales/all-locales   2015-09-18
    14:11:43.000000000 +0800
@@ -18,6 +18,7 @@
 de
 dsb
 el
+en-US
 en-GB
 en-ZA
 eo
```

15. 當找不到編碼時預設使用 UTF-8。

```
[dywang@dywnb SOURCES]$ vim mozilla-esr38/dom/encoding/FallbackEncoding.
    cpp
[dywang@dywnb SOURCES]$ diff -uN ../tmp/mozilla-esr38/dom/encoding/
    FallbackEncoding.cpp \
mozilla-esr38/dom/encoding/FallbackEncoding.cpp
--- ../tmp/mozilla-esr38/dom/encoding/FallbackEncoding.cpp  2016-02-11
    04:58:57.000000000 +0800
+++ mozilla-esr38/dom/encoding/FallbackEncoding.cpp 2016-03-10
    08:19:29.320247705 +0800
@@ -95,7 +95,7 @@

   if (NS_FAILED(nsUConvPropertySearch::SearchPropertyValue(
```

```
       localesFallbacks, ArrayLength(localesFallbacks), locale,
           mFallback))) {
-    mFallback.AssignLiteral("windows-1252");
+    mFallback.AssignLiteral("UTF-8");
   }

   aFallback = mFallback;
@@ -160,7 +160,7 @@
 {
   if (NS_FAILED(nsUConvPropertySearch::SearchPropertyValue(
       domainsFallbacks, ArrayLength(domainsFallbacks), aTLD, aFallback)
           )) {
-    aFallback.AssignLiteral("windows-1252");
+    aFallback.AssignLiteral("UTF-8");
   }
 }
```

16. unix 系統預設使用 UTF-8 編碼。

```
[dywang@dywnb SOURCES]$ vim mozilla-esr38/intl/locale/unix/
   nsDateTimeFormatUnix.cpp
[dywang@dywnb SOURCES]$ diff -uN ../tmp/mozilla-esr38/intl/locale/unix/
   nsDateTimeFormatUnix.cpp \
mozilla-esr38/intl/locale/unix/nsDateTimeFormatUnix.cpp
--- ../tmp/mozilla-esr38/intl/locale/unix/nsDateTimeFormatUnix.cpp
   2016-02-11 04:58:52.000000000 +0800
+++ mozilla-esr38/intl/locale/unix/nsDateTimeFormatUnix.cpp 2016-03-10
   08:20:39.057249265 +0800
@@ -45,7 +45,7 @@
     }
   }

-  mCharset.AssignLiteral("windows-1252");
+  mCharset.AssignLiteral("UTF-8");
   mPlatformLocale.AssignLiteral("en_US");

   // get locale name string, use app default if no locale specified
```

17. 預設等寬字 monospace，實際使用時不會等寬，故修改成 DejaVu Sans Mono，並修改預設字型大小等寬字爲 14。

```
[dywang@dywnb SOURCES]$ sed -i 's/windows-1252/UTF-8/g' \
mozilla-esr38/modules/libpref/init/all.js
[dywang@dywnb SOURCES]$ sed -i 's/\(font.size.fixed.*\)1[0-9]/\114/g' \
mozilla-esr38/modules/libpref/init/all.js
[dywang@dywnb SOURCES]$ diff -uN ../tmp/mozilla-esr38/modules/libpref/
   init/all.js \
mozilla-esr38/modules/libpref/init/all.js
```

```
--- ../tmp/mozilla-esr38/modules/libpref/init/all.js    2016-02-11
    04:59:02.000000000 +0800
+++ mozilla-esr38/modules/libpref/init/all.js   2016-03-10
    08:35:42.921269485 +0800
@@ -1718,7 +1718,7 @@
 // fallback charset list for Unicode conversion (converting from
     Unicode)
 // currently used for mail send only to handle symbol characters (e.g
     Euro, trademark, smartquotes)
 // for ISO-8859-1
-pref("intl.fallbackCharsetList.ISO-8859-1", "windows-1252");
+pref("intl.fallbackCharsetList.ISO-8859-1", "UTF-8");
 pref("font.language.group",                 "chrome://global/locale/
     intl.properties");

 // these locales have right-to-left UI
@@ -2407,142 +2407,142 @@
 pref("font.default.ar", "sans-serif");
 pref("font.minimum-size.ar", 0);
 pref("font.size.variable.ar", 16);
-pref("font.size.fixed.ar", 13);
+pref("font.size.fixed.ar", 14);

 pref("font.default.el", "serif");
 pref("font.minimum-size.el", 0);
 pref("font.size.variable.el", 16);
-pref("font.size.fixed.el", 13);
+pref("font.size.fixed.el", 14);

 pref("font.default.he", "sans-serif");
 pref("font.minimum-size.he", 0);
 pref("font.size.variable.he", 16);
-pref("font.size.fixed.he", 13);
+pref("font.size.fixed.he", 14);

 pref("font.default.ja", "sans-serif");
 pref("font.minimum-size.ja", 0);
 pref("font.size.variable.ja", 16);
-pref("font.size.fixed.ja", 16);
+pref("font.size.fixed.ja", 14);

 pref("font.default.ko", "sans-serif");
 pref("font.minimum-size.ko", 0);
 pref("font.size.variable.ko", 16);
-pref("font.size.fixed.ko", 16);
+pref("font.size.fixed.ko", 14);

 pref("font.default.th", "serif");
 pref("font.minimum-size.th", 0);
 pref("font.size.variable.th", 16);
-pref("font.size.fixed.th", 13);
+pref("font.size.fixed.th", 14);

 pref("font.default.x-cyrillic", "serif");
```

```
 pref("font.minimum-size.x-cyrillic", 0);
 pref("font.size.variable.x-cyrillic", 16);
-pref("font.size.fixed.x-cyrillic", 13);
+pref("font.size.fixed.x-cyrillic", 14);

 pref("font.default.x-devanagari", "serif");
 pref("font.minimum-size.x-devanagari", 0);
 pref("font.size.variable.x-devanagari", 16);
-pref("font.size.fixed.x-devanagari", 13);
+pref("font.size.fixed.x-devanagari", 14);

 pref("font.default.x-tamil", "serif");
 pref("font.minimum-size.x-tamil", 0);
 pref("font.size.variable.x-tamil", 16);
-pref("font.size.fixed.x-tamil", 13);
+pref("font.size.fixed.x-tamil", 14);

 pref("font.default.x-armn", "serif");
 pref("font.minimum-size.x-armn", 0);
 pref("font.size.variable.x-armn", 16);
-pref("font.size.fixed.x-armn", 13);
+pref("font.size.fixed.x-armn", 14);

 pref("font.default.x-beng", "serif");
 pref("font.minimum-size.x-beng", 0);
 pref("font.size.variable.x-beng", 16);
-pref("font.size.fixed.x-beng", 13);
+pref("font.size.fixed.x-beng", 14);

 pref("font.default.x-cans", "serif");
 pref("font.minimum-size.x-cans", 0);
 pref("font.size.variable.x-cans", 16);
-pref("font.size.fixed.x-cans", 13);
+pref("font.size.fixed.x-cans", 14);

 pref("font.default.x-ethi", "serif");
 pref("font.minimum-size.x-ethi", 0);
 pref("font.size.variable.x-ethi", 16);
-pref("font.size.fixed.x-ethi", 13);
+pref("font.size.fixed.x-ethi", 14);

 pref("font.default.x-geor", "serif");
 pref("font.minimum-size.x-geor", 0);
 pref("font.size.variable.x-geor", 16);
-pref("font.size.fixed.x-geor", 13);
+pref("font.size.fixed.x-geor", 14);

 pref("font.default.x-gujr", "serif");
 pref("font.minimum-size.x-gujr", 0);
 pref("font.size.variable.x-gujr", 16);
-pref("font.size.fixed.x-gujr", 13);
+pref("font.size.fixed.x-gujr", 14);

 pref("font.default.x-guru", "serif");
```

```
 pref("font.minimum-size.x-guru", 0);
 pref("font.size.variable.x-guru", 16);
-pref("font.size.fixed.x-guru", 13);
+pref("font.size.fixed.x-guru", 14);

 pref("font.default.x-khmr", "serif");
 pref("font.minimum-size.x-khmr", 0);
 pref("font.size.variable.x-khmr", 16);
-pref("font.size.fixed.x-khmr", 13);
+pref("font.size.fixed.x-khmr", 14);

 pref("font.default.x-mlym", "serif");
 pref("font.minimum-size.x-mlym", 0);
 pref("font.size.variable.x-mlym", 16);
-pref("font.size.fixed.x-mlym", 13);
+pref("font.size.fixed.x-mlym", 14);

 pref("font.default.x-orya", "serif");
 pref("font.minimum-size.x-orya", 0);
 pref("font.size.variable.x-orya", 16);
-pref("font.size.fixed.x-orya", 13);
+pref("font.size.fixed.x-orya", 14);

 pref("font.default.x-telu", "serif");
 pref("font.minimum-size.x-telu", 0);
 pref("font.size.variable.x-telu", 16);
-pref("font.size.fixed.x-telu", 13);
+pref("font.size.fixed.x-telu", 14);

 pref("font.default.x-knda", "serif");
 pref("font.minimum-size.x-knda", 0);
 pref("font.size.variable.x-knda", 16);
-pref("font.size.fixed.x-knda", 13);
+pref("font.size.fixed.x-knda", 14);

 pref("font.default.x-sinh", "serif");
 pref("font.minimum-size.x-sinh", 0);
 pref("font.size.variable.x-sinh", 16);
-pref("font.size.fixed.x-sinh", 13);
+pref("font.size.fixed.x-sinh", 14);

 pref("font.default.x-tibt", "serif");
 pref("font.minimum-size.x-tibt", 0);
 pref("font.size.variable.x-tibt", 16);
-pref("font.size.fixed.x-tibt", 13);
+pref("font.size.fixed.x-tibt", 14);

 pref("font.default.x-unicode", "serif");
 pref("font.minimum-size.x-unicode", 0);
 pref("font.size.variable.x-unicode", 16);
-pref("font.size.fixed.x-unicode", 13);
+pref("font.size.fixed.x-unicode", 14);

 pref("font.default.x-western", "serif");
```

```
164  pref("font.minimum-size.x-western", 0);
     pref("font.size.variable.x-western", 16);
166 -pref("font.size.fixed.x-western", 13);
    +pref("font.size.fixed.x-western", 14);
168
     pref("font.default.zh-CN", "sans-serif");
170  pref("font.minimum-size.zh-CN", 0);
     pref("font.size.variable.zh-CN", 16);
172 -pref("font.size.fixed.zh-CN", 16);
    +pref("font.size.fixed.zh-CN", 14);
174
     pref("font.default.zh-HK", "sans-serif");
176  pref("font.minimum-size.zh-HK", 0);
     pref("font.size.variable.zh-HK", 16);
178 -pref("font.size.fixed.zh-HK", 16);
    +pref("font.size.fixed.zh-HK", 14);
180
     pref("font.default.zh-TW", "sans-serif");
182  pref("font.minimum-size.zh-TW", 0);
     pref("font.size.variable.zh-TW", 16);
184 -pref("font.size.fixed.zh-TW", 16);
    +pref("font.size.fixed.zh-TW", 14);
186
     /*
188   * A value greater than zero enables font size inflation for
    @@ -2677,191 +2677,191 @@
190  pref("font.name.serif.ar", "Times New Roman");
     pref("font.name.sans-serif.ar", "Segoe UI");
192  pref("font.name-list.sans-serif.ar", "Segoe UI, Tahoma, Arial");
    -pref("font.name.monospace.ar", "Courier New");
194 +pref("font.name.monospace.ar", "Dejavu Sans Mono");
     pref("font.name.cursive.ar", "Comic Sans MS");
196
     pref("font.name.serif.el", "Times New Roman");
198  pref("font.name.sans-serif.el", "Arial");
    -pref("font.name.monospace.el", "Courier New");
200 +pref("font.name.monospace.el", "Dejavu Sans Mono");
     pref("font.name.cursive.el", "Comic Sans MS");
202
     pref("font.name.serif.he", "Narkisim");
204  pref("font.name.sans-serif.he", "Arial");
    -pref("font.name.monospace.he", "Fixed Miriam Transparent");
206 +pref("font.name.monospace.he", "Dejavu Sans Mono");
     pref("font.name.cursive.he", "Guttman Yad");
208  pref("font.name-list.serif.he", "Narkisim, David");
    -pref("font.name-list.monospace.he", "Fixed Miriam Transparent, Miriam
        Fixed, Rod, Courier New");
210 +pref("font.name-list.monospace.he", "Dejavu Sans Mono");
     pref("font.name-list.cursive.he", "Guttman Yad, Ktav, Arial");
212
     pref("font.name.serif.ja", "MS PMincho");
214  pref("font.name.sans-serif.ja", "MS PGothic");
    -pref("font.name.monospace.ja", "MS Gothic");
216 +pref("font.name.monospace.ja", "Dejavu Sans Mono");
```

```
 pref("font.name-list.serif.ja", "MS PMincho, MS Mincho, MS PGothic, MS
     Gothic,Meiryo");
218  pref("font.name-list.sans-serif.ja", "MS PGothic, MS Gothic, MS PMincho
     , MS Mincho,Meiryo");
-pref("font.name-list.monospace.ja", "MS Gothic, MS Mincho, MS PGothic,
    MS PMincho,Meiryo");
220 +pref("font.name-list.monospace.ja", "Dejavu Sans Mono");

222  pref("font.name.serif.ko", "Batang");
 pref("font.name.sans-serif.ko", "Gulim");
224 -pref("font.name.monospace.ko", "GulimChe");
+pref("font.name.monospace.ko", "Dejavu Sans Mono");
226  pref("font.name.cursive.ko", "Gungsuh");

228  pref("font.name-list.serif.ko", "Batang, Gulim");
 pref("font.name-list.sans-serif.ko", "Gulim");
230 -pref("font.name-list.monospace.ko", "GulimChe");
+pref("font.name-list.monospace.ko", "Dejavu Sans Mono");
232  pref("font.name-list.cursive.ko", "Gungsuh");

234  pref("font.name.serif.th", "Tahoma");
 pref("font.name.sans-serif.th", "Tahoma");
236 -pref("font.name.monospace.th", "Tahoma");
+pref("font.name.monospace.th", "Dejavu Sans Mono");
238  pref("font.name.cursive.th", "Tahoma");

240  pref("font.name.serif.x-cyrillic", "Times New Roman");
 pref("font.name.sans-serif.x-cyrillic", "Arial");
242 -pref("font.name.monospace.x-cyrillic", "Courier New");
+pref("font.name.monospace.x-cyrillic", "Dejavu Sans Mono");
244  pref("font.name.cursive.x-cyrillic", "Comic Sans MS");

246  pref("font.name.serif.x-unicode", "Times New Roman");
 pref("font.name.sans-serif.x-unicode", "Arial");
248 -pref("font.name.monospace.x-unicode", "Courier New");
+pref("font.name.monospace.x-unicode", "Dejavu Sans Mono");
250  pref("font.name.cursive.x-unicode", "Comic Sans MS");

252  pref("font.name.serif.x-western", "Times New Roman");
 pref("font.name.sans-serif.x-western", "Arial");
254 -pref("font.name.monospace.x-western", "Courier New");
+pref("font.name.monospace.x-western", "Dejavu Sans Mono");
256  pref("font.name.cursive.x-western", "Comic Sans MS");

258  pref("font.name.serif.zh-CN", "SimSun");
 pref("font.name.sans-serif.zh-CN", "Microsoft YaHei");
260 -pref("font.name.monospace.zh-CN", "SimSun");
+pref("font.name.monospace.zh-CN", "Dejavu Sans Mono");
262  pref("font.name.cursive.zh-CN", "KaiTi");
 pref("font.name-list.serif.zh-CN", "MS Song, SimSun, SimSun-ExtB");
264  pref("font.name-list.sans-serif.zh-CN", "Microsoft YaHei, SimHei, Arial
     Unicode MS");
-pref("font.name-list.monospace.zh-CN", "MS Song, SimSun, SimSun-ExtB");
266 +pref("font.name-list.monospace.zh-CN", "Dejavu Sans Mono");
```

```
268  // Per Taiwanese users' demand. They don't want to use TC fonts for
     // rendering Latin letters. (bug 88579)
270  pref("font.name.serif.zh-TW", "Times New Roman");
     pref("font.name.sans-serif.zh-TW", "Arial");
272 -pref("font.name.monospace.zh-TW", "MingLiU");
    +pref("font.name.monospace.zh-TW", "Dejavu Sans Mono");
274  pref("font.name-list.serif.zh-TW", "PMingLiu, MingLiU, MingLiU-ExtB");
     pref("font.name-list.sans-serif.zh-TW", "PMingLiU, MingLiU, MingLiU-
         ExtB");
276 -pref("font.name-list.monospace.zh-TW", "MingLiU, MingLiU-ExtB");
    +pref("font.name-list.monospace.zh-TW", "Dejavu Sans Mono");
278
     // hkscsm3u.ttf (HKSCS-2001) :  http://www.microsoft.com/hk/hkscs
280  // Hong Kong users have the same demand about glyphs for Latin letters
         (bug 88579)
     pref("font.name.serif.zh-HK", "Times New Roman");
282  pref("font.name.sans-serif.zh-HK", "Arial");
    -pref("font.name.monospace.zh-HK", "MingLiu_HKSCS");
284 +pref("font.name.monospace.zh-HK", "Dejavu Sans Mono");
     pref("font.name-list.serif.zh-HK", "MingLiu_HKSCS, Ming(for ISO10646),
         MingLiU, MingLiU_HKSCS-ExtB");
286  pref("font.name-list.sans-serif.zh-HK", "MingLiU_HKSCS, Ming(for
         ISO10646), MingLiU, MingLiU_HKSCS-ExtB");
    -pref("font.name-list.monospace.zh-HK", "MingLiU_HKSCS, Ming(for
       ISO10646), MingLiU, MingLiU_HKSCS-ExtB");
288 +pref("font.name-list.monospace.zh-HK", "Dejavu Sans Mono");

290  pref("font.name.serif.x-devanagari", "Kokila");
     pref("font.name.sans-serif.x-devanagari", "Nirmala UI");
292 -pref("font.name.monospace.x-devanagari", "Mangal");
    +pref("font.name.monospace.x-devanagari", "Dejavu Sans Mono");
294  pref("font.name-list.serif.x-devanagari", "Kokila, Raghindi");
     pref("font.name-list.sans-serif.x-devanagari", "Nirmala UI, Mangal");
296 -pref("font.name-list.monospace.x-devanagari", "Mangal, Nirmala UI");
    +pref("font.name-list.monospace.x-devanagari", "Dejavu Sans Mono");
298
     pref("font.name.serif.x-tamil", "Latha");
300  pref("font.name.sans-serif.x-tamil", "Code2000");
    -pref("font.name.monospace.x-tamil", "Latha");
302 +pref("font.name.monospace.x-tamil", "Dejavu Sans Mono");
     pref("font.name-list.serif.x-tamil", "Latha, Code2000");
304 -pref("font.name-list.monospace.x-tamil", "Latha, Code2000");
    +pref("font.name-list.monospace.x-tamil", "Dejavu Sans Mono");
306
     # http://www.alanwood.net/unicode/fonts.html
308
     pref("font.name.serif.x-armn", "Sylfaen");
310  pref("font.name.sans-serif.x-armn", "Arial AMU");
    -pref("font.name.monospace.x-armn", "Arial AMU");
312 +pref("font.name.monospace.x-armn", "Dejavu Sans Mono");
     pref("font.name-list.serif.x-armn", "Sylfaen,Arial Unicode MS, Code2000
         ");
314 -pref("font.name-list.monospace.x-armn", "Arial AMU, Arial Unicode MS,
```

```
    Code2000");
+pref("font.name-list.monospace.x-armn", "Dejavu Sans Mono");
316
 pref("font.name.serif.x-beng", "Vrinda");
318 pref("font.name.sans-serif.x-beng", "Vrinda");
-pref("font.name.monospace.x-beng", "Mitra Mono");
320 +pref("font.name.monospace.x-beng", "Dejavu Sans Mono");
 pref("font.name-list.serif.x-beng", "Vrinda, Akaash, Likhan, Ekushey
     Punarbhaba, Code2000, Arial Unicode MS");
322 pref("font.name-list.sans-serif.x-beng", "Vrinda, Akaash, Likhan,
     Ekushey Punarbhaba, Code2000, Arial Unicode MS");
-pref("font.name-list.monospace.x-beng", "Likhan, Mukti Narrow, Code2000
    , Arial Unicode MS");
324 +pref("font.name-list.monospace.x-beng", "Dejavu Sans Mono");

326 pref("font.name.serif.x-cans", "Aboriginal Serif");
 pref("font.name.sans-serif.x-cans", "Aboriginal Sans");
328 -pref("font.name.monospace.x-cans", "Aboriginal Sans");
+pref("font.name.monospace.x-cans", "Dejavu Sans Mono");
330 pref("font.name-list.serif.x-cans", "Aboriginal Serif, BJCree Uni");
-pref("font.name-list.monospace.x-cans", "Aboriginal Sans, OskiDakelh,
    Pigiarniq, Uqammaq");
332 +pref("font.name-list.monospace.x-cans", "Dejavu Sans Mono");

334 pref("font.name.serif.x-ethi", "Visual Geez Unicode");
 pref("font.name.sans-serif.x-ethi", "GF Zemen Unicode");
336 pref("font.name.cursive.x-ethi", "Visual Geez Unicode Title");
-pref("font.name.monospace.x-ethi", "Ethiopia Jiret");
338 +pref("font.name.monospace.x-ethi", "Dejavu Sans Mono");
 pref("font.name-list.serif.x-ethi", "Visual Geez Unicode, Visual Geez
     Unicode Agazian, Code2000");
340 -pref("font.name-list.monospace.x-ethi", "Ethiopia Jiret, Code2000");
+pref("font.name-list.monospace.x-ethi", "Dejavu Sans Mono");
342
 pref("font.name.serif.x-geor", "Sylfaen");
344 pref("font.name.sans-serif.x-geor", "BPG Classic 99U");
-pref("font.name.monospace.x-geor", "Code2000");
346 +pref("font.name.monospace.x-geor", "Dejavu Sans Mono");
 pref("font.name-list.serif.x-geor", "Sylfaen, BPG Paata Khutsuri U,
     TITUS Cyberbit Basic");
348 -pref("font.name-list.monospace.x-geor", "BPG Classic 99U, Code2000,
    Arial Unicode MS");
+pref("font.name-list.monospace.x-geor", "Dejavu Sans Mono");
350
 pref("font.name.serif.x-gujr", "Shruti");
352 pref("font.name.sans-serif.x-gujr", "Shruti");
-pref("font.name.monospace.x-gujr", "Code2000");
354 +pref("font.name.monospace.x-gujr", "Dejavu Sans Mono");
 pref("font.name-list.serif.x-gujr", "Shruti, Code2000, Arial Unicode MS
     ");
356 -pref("font.name-list.monospace.x-gujr", "Code2000, Shruti, Arial
    Unicode MS");
+pref("font.name-list.monospace.x-gujr", "Dejavu Sans Mono");
358
```

```
 pref("font.name.serif.x-guru", "Raavi");
 pref("font.name.sans-serif.x-guru", "Code2000");
-pref("font.name.monospace.x-guru", "Code2000");
+pref("font.name.monospace.x-guru", "Dejavu Sans Mono");
 pref("font.name-list.serif.x-guru", "Raavi, Saab, Code2000, Arial
     Unicode MS");
-pref("font.name-list.monospace.x-guru", "Code2000, Raavi, Saab, Arial
    Unicode MS");
+pref("font.name-list.monospace.x-guru", "Dejavu Sans Mono");

 pref("font.name.serif.x-khmr", "PhnomPenh OT");
 pref("font.name.sans-serif.x-khmr", "Khmer OS");
-pref("font.name.monospace.x-khmr", "Code2000");
+pref("font.name.monospace.x-khmr", "Dejavu Sans Mono");
 pref("font.name-list.serif.x-khmr", "PhnomPenh OT,.Mondulkiri U GR 1.5,
      Khmer OS");
-pref("font.name-list.monospace.x-khmr", "Code2000, Khmer OS, Khmer OS
    System");
+pref("font.name-list.monospace.x-khmr", "Dejavu Sans Mono");

 pref("font.name.serif.x-mlym", "Rachana_w01");
 pref("font.name.sans-serif.x-mlym", "Rachana_w01");
-pref("font.name.monospace.x-mlym", "Rachana_w01");
+pref("font.name.monospace.x-mlym", "Dejavu Sans Mono");
 pref("font.name-list.serif.x-mlym", "AnjaliOldLipi, Kartika,
     ThoolikaUnicode, Code2000, Arial Unicode MS");
 pref("font.name-list.sans-serif.x-mlym", "AnjaliOldLipi, Kartika,
     ThoolikaUnicode, Code2000, Arial Unicode MS");
-pref("font.name-list.monospace.x-mlym", "AnjaliOldLipi, Kartika,
    ThoolikaUnicode, Code2000, Arial Unicode MS");
+pref("font.name-list.monospace.x-mlym", "Dejavu Sans Mono");

 pref("font.name.serif.x-orya", "ori1Uni");
 pref("font.name.sans-serif.x-orya", "ori1Uni");
-pref("font.name.monospace.x-orya", "ori1Uni");
+pref("font.name.monospace.x-orya", "Dejavu Sans Mono");
 pref("font.name-list.serif.x-orya", "Kalinga, ori1Uni, Code2000, Arial
     Unicode MS");
 pref("font.name-list.sans-serif.x-orya", "Kalinga, ori1Uni, Code2000,
     Arial Unicode MS");
-pref("font.name-list.monospace.x-orya", "Kalinga, ori1Uni, Code2000,
    Arial Unicode MS");
+pref("font.name-list.monospace.x-orya", "Dejavu Sans Mono");

 pref("font.name.serif.x-telu", "Gautami");
 pref("font.name.sans-serif.x-telu", "Gautami");
-pref("font.name.monospace.x-telu", "Gautami");
+pref("font.name.monospace.x-telu", "Dejavu Sans Mono");
 pref("font.name-list.serif.x-telu", "Gautami, Akshar Unicode, Code2000,
      Arial Unicode MS");
 pref("font.name-list.sans-serif.x-telu", "Gautami, Akshar Unicode,
     Code2000, Arial Unicode MS");
-pref("font.name-list.monospace.x-telu", "Gautami, Akshar Unicode,
    Code2000, Arial Unicode MS");
```

```
400 +pref("font.name-list.monospace.x-telu", "Dejavu Sans Mono");
402  pref("font.name.serif.x-knda", "Tunga");
     pref("font.name.sans-serif.x-knda", "Tunga");
404 -pref("font.name.monospace.x-knda", "Tunga");
    +pref("font.name.monospace.x-knda", "Dejavu Sans Mono");
406  pref("font.name-list.serif.x-knda", "Tunga, AksharUnicode, Code2000,
         Arial Unicode MS");
     pref("font.name-list.sans-serif.x-knda", "Tunga, AksharUnicode,
         Code2000, Arial Unicode MS");
408 -pref("font.name-list.monospace.x-knda", "Tunga, AksharUnicode, Code2000
        , Arial Unicode MS");
    +pref("font.name-list.monospace.x-knda", "Dejavu Sans Mono");
410
     pref("font.name.serif.x-sinh", "Iskoola Pota");
412  pref("font.name.sans-serif.x-sinh", "Iskoola Pota");
    -pref("font.name.monospace.x-sinh", "Iskoola Pota");
414 +pref("font.name.monospace.x-sinh", "Dejavu Sans Mono");
     pref("font.name-list.serif.x-sinh", "Iskoola Pota, AksharUnicode");
416  pref("font.name-list.sans-serif.x-sinh", "Iskoola Pota, AksharUnicode")
         ;
    -pref("font.name-list.monospace.x-sinh", "Iskoola Pota, AksharUnicode");
418 +pref("font.name-list.monospace.x-sinh", "Dejavu Sans Mono");
420  pref("font.name.serif.x-tibt", "Tibetan Machine Uni");
     pref("font.name.sans-serif.x-tibt", "Tibetan Machine Uni");
422 -pref("font.name.monospace.x-tibt", "Tibetan Machine Uni");
    +pref("font.name.monospace.x-tibt", "Dejavu Sans Mono");
424  pref("font.name-list.serif.x-tibt", "Tibetan Machine Uni, Jomolhari,
         Microsoft Himalaya");
     pref("font.name-list.sans-serif.x-tibt", "Tibetan Machine Uni,
         Jomolhari, Microsoft Himalaya");
426 -pref("font.name-list.monospace.x-tibt", "Tibetan Machine Uni, Jomolhari
        , Microsoft Himalaya");
    +pref("font.name-list.monospace.x-tibt", "Dejavu Sans Mono");
428
     pref("font.minimum-size.th", 10);
430
    @@ -3027,105 +3027,105 @@
432
     pref("font.name.serif.ar", "Al Bayan");
434  pref("font.name.sans-serif.ar", "Geeza Pro");
    -pref("font.name.monospace.ar", "Geeza Pro");
436 +pref("font.name.monospace.ar", "Dejavu Sans Mono");
     pref("font.name.cursive.ar", "DecoType Naskh");
438  pref("font.name.fantasy.ar", "KufiStandardGK");
     pref("font.name-list.serif.ar", "Al Bayan");
440  pref("font.name-list.sans-serif.ar", "Geeza Pro");
    -pref("font.name-list.monospace.ar", "Geeza Pro");
442 +pref("font.name-list.monospace.ar", "Dejavu Sans Mono");
     pref("font.name-list.cursive.ar", "DecoType Naskh");
444  pref("font.name-list.fantasy.ar", "KufiStandardGK");
446  pref("font.name.serif.el", "Times");
```

```
 pref("font.name.sans-serif.el", "Helvetica");
-pref("font.name.monospace.el", "Courier New");
+pref("font.name.monospace.el", "Dejavu Sans Mono");
 pref("font.name.cursive.el", "Lucida Grande");
 pref("font.name.fantasy.el", "Lucida Grande");
 pref("font.name-list.serif.el", "Times,Times New Roman");
 pref("font.name-list.sans-serif.el", "Helvetica,Lucida Grande");
-pref("font.name-list.monospace.el", "Courier New,Lucida Grande");
+pref("font.name-list.monospace.el", "Dejavu Sans Mono");
 pref("font.name-list.cursive.el", "Times,Lucida Grande");
 pref("font.name-list.fantasy.el", "Times,Lucida Grande");

 pref("font.name.serif.he", "Times New Roman");
 pref("font.name.sans-serif.he", "Arial");
-pref("font.name.monospace.he", "Courier New");
+pref("font.name.monospace.he", "Dejavu Sans Mono");
 pref("font.name.cursive.he", "Times New Roman");
 pref("font.name.fantasy.he", "Times New Roman");
 pref("font.name-list.serif.he", "Times New Roman");
 pref("font.name-list.sans-serif.he", "Arial");
-pref("font.name-list.monospace.he", "Courier New");
+pref("font.name-list.monospace.he", "Dejavu Sans Mono");
 pref("font.name-list.cursive.he", "Times New Roman");
 pref("font.name-list.fantasy.he", "Times New Roman");

 pref("font.name.serif.ja", "Hiragino Mincho ProN");
 pref("font.name.sans-serif.ja", "Hiragino Kaku Gothic ProN");
-pref("font.name.monospace.ja", "Osaka-Mono");
+pref("font.name.monospace.ja", "Dejavu Sans Mono");
 pref("font.name-list.serif.ja", "Hiragino Mincho ProN,Hiragino Mincho
     Pro");
 pref("font.name-list.sans-serif.ja", "Hiragino Kaku Gothic ProN,
     Hiragino Kaku Gothic Pro");
-pref("font.name-list.monospace.ja", "Osaka-Mono");
+pref("font.name-list.monospace.ja", "Dejavu Sans Mono");

 pref("font.name.serif.ko", "AppleMyungjo");
 pref("font.name.sans-serif.ko", "Apple SD Gothic Neo");
-pref("font.name.monospace.ko", "Apple SD Gothic Neo");
+pref("font.name.monospace.ko", "Dejavu Sans Mono");
 pref("font.name-list.serif.ko", "AppleMyungjo");
 pref("font.name-list.sans-serif.ko", "Apple SD Gothic Neo,AppleGothic")
     ;
-pref("font.name-list.monospace.ko", "Apple SD Gothic Neo,AppleGothic");
+pref("font.name-list.monospace.ko", "Dejavu Sans Mono");

 pref("font.name.serif.th", "Thonburi");
 pref("font.name.sans-serif.th", "Thonburi");
-pref("font.name.monospace.th", "Ayuthaya");
+pref("font.name.monospace.th", "Dejavu Sans Mono");
 pref("font.name-list.serif.th", "Thonburi");
 pref("font.name-list.sans-serif.th", "Thonburi");
-pref("font.name-list.monospace.th", "Ayuthaya");
+pref("font.name-list.monospace.th", "Dejavu Sans Mono");
```

```
498
 pref("font.name.serif.x-armn", "Mshtakan");
500 pref("font.name.sans-serif.x-armn", "Mshtakan");
-pref("font.name.monospace.x-armn", "Mshtakan");
502 +pref("font.name.monospace.x-armn", "Dejavu Sans Mono");
 pref("font.name-list.serif.x-armn", "Mshtakan");
504 pref("font.name-list.sans-serif.x-armn", "Mshtakan");
-pref("font.name-list.monospace.x-armn", "Mshtakan");
506 +pref("font.name-list.monospace.x-armn", "Dejavu Sans Mono");

508 // SolaimanLipi, Rupali http://ekushey.org/?page/mac_download
 pref("font.name.serif.x-beng", "Bangla MN");
510 pref("font.name.sans-serif.x-beng", "Bangla Sangam MN");
-pref("font.name.monospace.x-beng", "Bangla Sangam MN");
512 +pref("font.name.monospace.x-beng", "Dejavu Sans Mono");
 pref("font.name-list.serif.x-beng", "Bangla MN");
514 pref("font.name-list.sans-serif.x-beng", "Bangla Sangam MN");
-pref("font.name-list.monospace.x-beng", "Bangla Sangam MN");
516 +pref("font.name-list.monospace.x-beng", "Dejavu Sans Mono");

518 pref("font.name.serif.x-cans", "Euphemia UCAS");
 pref("font.name.sans-serif.x-cans", "Euphemia UCAS");
520 -pref("font.name.monospace.x-cans", "Euphemia UCAS");
+pref("font.name.monospace.x-cans", "Dejavu Sans Mono");
522 pref("font.name-list.serif.x-cans", "Euphemia UCAS");
 pref("font.name-list.sans-serif.x-cans", "Euphemia UCAS");
524 -pref("font.name-list.monospace.x-cans", "Euphemia UCAS");
+pref("font.name-list.monospace.x-cans", "Dejavu Sans Mono");
526
 pref("font.name.serif.x-cyrillic", "Times");
528 pref("font.name.sans-serif.x-cyrillic", "Helvetica");
-pref("font.name.monospace.x-cyrillic", "Monaco");
530 +pref("font.name.monospace.x-cyrillic", "Dejavu Sans Mono");
 pref("font.name.cursive.x-cyrillic", "Geneva");
532 pref("font.name.fantasy.x-cyrillic", "Charcoal CY");
 pref("font.name-list.serif.x-cyrillic", "Times,Times New Roman");
534 pref("font.name-list.sans-serif.x-cyrillic", "Helvetica,Arial");
-pref("font.name-list.monospace.x-cyrillic", "Monaco,Courier New");
536 +pref("font.name-list.monospace.x-cyrillic", "Dejavu Sans Mono");
 pref("font.name-list.cursive.x-cyrillic", "Geneva");
538 pref("font.name-list.fantasy.x-cyrillic", "Charcoal CY");

540 pref("font.name.serif.x-devanagari", "Devanagari MT");
 pref("font.name.sans-serif.x-devanagari", "Devanagari Sangam MN");
542 -pref("font.name.monospace.x-devanagari", "Devanagari Sangam MN");
+pref("font.name.monospace.x-devanagari", "Dejavu Sans Mono");
544 pref("font.name-list.serif.x-devanagari", "Devanagari MT");
 pref("font.name-list.sans-serif.x-devanagari", "Devanagari Sangam MN,
    Devanagari MT");
546 -pref("font.name-list.monospace.x-devanagari", "Devanagari Sangam MN,
   Devanagari MT");
+pref("font.name-list.monospace.x-devanagari", "Dejavu Sans Mono");
548
 // Abyssinica SIL http://scripts.sil.org/AbyssinicaSIL_Download
```

```
 pref("font.name.serif.x-ethi", "Kefa");
 pref("font.name.sans-serif.x-ethi", "Kefa");
-pref("font.name.monospace.x-ethi", "Kefa");
+pref("font.name.monospace.x-ethi", "Dejavu Sans Mono");
 pref("font.name-list.serif.x-ethi", "Kefa,Abyssinica SIL");
 pref("font.name-list.sans-serif.x-ethi", "Kefa,Abyssinica SIL");
-pref("font.name-list.monospace.x-ethi", "Kefa,Abyssinica SIL");
+pref("font.name-list.monospace.x-ethi", "Dejavu Sans Mono");

 // no suitable fonts for georgian ship with mac os x
 // however some can be freely downloaded
@@ -3133,126 +3133,126 @@
 // Zuzumbo http://homepage.mac.com/rsiradze/FileSharing91.html
 pref("font.name.serif.x-geor", "TITUS Cyberbit Basic");
 pref("font.name.sans-serif.x-geor", "Zuzumbo");
-pref("font.name.monospace.x-geor", "Zuzumbo");
+pref("font.name.monospace.x-geor", "Dejavu Sans Mono");
 pref("font.name-list.serif.x-geor", "TITUS Cyberbit Basic");
 pref("font.name-list.sans-serif.x-geor", "Zuzumbo");
-pref("font.name-list.monospace.x-geor", "Zuzumbo");
+pref("font.name-list.monospace.x-geor", "Dejavu Sans Mono");

 pref("font.name.serif.x-gujr", "Gujarati MT");
 pref("font.name.sans-serif.x-gujr", "Gujarati Sangam MN");
-pref("font.name.monospace.x-gujr", "Gujarati Sangam MN");
+pref("font.name.monospace.x-gujr", "Dejavu Sans Mono");
 pref("font.name-list.serif.x-gujr", "Gujarati MT");
-pref("font.name-list.sans-serif.x-gujr", "Gujarati Sangam MN,Gujarati MT");
-pref("font.name-list.monospace.x-gujr", "Gujarati Sangam MN,Gujarati MT");
+pref("font.name-list.monospace.x-gujr", "Dejavu Sans Mono");

 pref("font.name.serif.x-guru", "Gurmukhi MT");
 pref("font.name.sans-serif.x-guru", "Gurmukhi MT");
-pref("font.name.monospace.x-guru", "Gurmukhi MT");
+pref("font.name.monospace.x-guru", "Dejavu Sans Mono");
 pref("font.name-list.serif.x-guru", "Gurmukhi MT");
 pref("font.name-list.sans-serif.x-guru", "Gurmukhi MT");
-pref("font.name-list.monospace.x-guru", "Gurmukhi MT");
+pref("font.name-list.monospace.x-guru", "Dejavu Sans Mono");

 pref("font.name.serif.x-khmr", "Khmer MN");
 pref("font.name.sans-serif.x-khmr", "Khmer Sangam MN");
-pref("font.name.monospace.x-khmr", "Khmer Sangam MN");
+pref("font.name.monospace.x-khmr", "Dejavu Sans Mono");
 pref("font.name-list.serif.x-khmr", "Khmer MN");
 pref("font.name-list.sans-serif.x-khmr", "Khmer Sangam MN");
-pref("font.name-list.monospace.x-khmr", "Khmer Sangam MN");
+pref("font.name-list.monospace.x-khmr", "Dejavu Sans Mono");

 pref("font.name.serif.x-mlym", "Malayalam MN");
 pref("font.name.sans-serif.x-mlym", "Malayalam Sangam MN");
-pref("font.name.monospace.x-mlym", "Malayalam Sangam MN");
```

```
602 +pref("font.name.monospace.x-mlym", "Dejavu Sans Mono");
     pref("font.name-list.serif.x-mlym", "Malayalam MN");
604  pref("font.name-list.sans-serif.x-mlym", "Malayalam Sangam MN");
    -pref("font.name-list.monospace.x-mlym", "Malayalam Sangam MN");
606 +pref("font.name-list.monospace.x-mlym", "Dejavu Sans Mono");

608  pref("font.name.serif.x-orya", "Oriya MN");
     pref("font.name.sans-serif.x-orya", "Oriya Sangam MN");
610 -pref("font.name.monospace.x-orya", "Oriya Sangam MN");
    +pref("font.name.monospace.x-orya", "Dejavu Sans Mono");
612  pref("font.name-list.serif.x-orya", "Oriya MN");
     pref("font.name-list.sans-serif.x-orya", "Oriya Sangam MN");
614 -pref("font.name-list.monospace.x-orya", "Oriya Sangam MN");
    +pref("font.name-list.monospace.x-orya", "Dejavu Sans Mono");
616
     // Pothana http://web.nickshanks.com/typography/telugu/
618  pref("font.name.serif.x-telu", "Telugu MN");
     pref("font.name.sans-serif.x-telu", "Telugu Sangam MN");
620 -pref("font.name.monospace.x-telu", "Telugu Sangam MN");
    +pref("font.name.monospace.x-telu", "Dejavu Sans Mono");
622  pref("font.name-list.serif.x-telu", "Telugu MN,Pothana");
     pref("font.name-list.sans-serif.x-telu", "Telugu Sangam MN,Pothana");
624 -pref("font.name-list.monospace.x-telu", "Telugu Sangam MN,Pothana");
    +pref("font.name-list.monospace.x-telu", "Dejavu Sans Mono");
626
     // Kedage http://web.nickshanks.com/typography/kannada/
628  pref("font.name.serif.x-knda", "Kannada MN");
     pref("font.name.sans-serif.x-knda", "Kannada Sangam MN");
630 -pref("font.name.monospace.x-knda", "Kannada Sangam MN");
    +pref("font.name.monospace.x-knda", "Dejavu Sans Mono");
632  pref("font.name-list.serif.x-knda", "Kannada MN,Kedage");
     pref("font.name-list.sans-serif.x-knda", "Kannada Sangam MN,Kedage");
634 -pref("font.name-list.monospace.x-knda", "Kannada Sangam MN,Kedage");
    +pref("font.name-list.monospace.x-knda", "Dejavu Sans Mono");
636
     pref("font.name.serif.x-sinh", "Sinhala MN");
638  pref("font.name.sans-serif.x-sinh", "Sinhala Sangam MN");
    -pref("font.name.monospace.x-sinh", "Sinhala Sangam MN");
640 +pref("font.name.monospace.x-sinh", "Dejavu Sans Mono");
     pref("font.name-list.serif.x-sinh", "Sinhala MN");
642  pref("font.name-list.sans-serif.x-sinh", "Sinhala Sangam MN");
    -pref("font.name-list.monospace.x-sinh", "Sinhala Sangam MN");
644 +pref("font.name-list.monospace.x-sinh", "Dejavu Sans Mono");

646  pref("font.name.serif.x-tamil", "InaiMathi");
     pref("font.name.sans-serif.x-tamil", "InaiMathi");
648 -pref("font.name.monospace.x-tamil", "InaiMathi");
    +pref("font.name.monospace.x-tamil", "Dejavu Sans Mono");
650  pref("font.name-list.serif.x-tamil", "InaiMathi");
     pref("font.name-list.sans-serif.x-tamil", "InaiMathi");
652 -pref("font.name-list.monospace.x-tamil", "InaiMathi");
    +pref("font.name-list.monospace.x-tamil", "Dejavu Sans Mono");
654
     // Kailasa ships with mac os x >= 10.5
```

```
656  pref("font.name.serif.x-tibt", "Kailasa");
     pref("font.name.sans-serif.x-tibt", "Kailasa");
658 -pref("font.name.monospace.x-tibt", "Kailasa");
    +pref("font.name.monospace.x-tibt", "Dejavu Sans Mono");
660  pref("font.name-list.serif.x-tibt", "Kailasa");
     pref("font.name-list.sans-serif.x-tibt", "Kailasa");
662 -pref("font.name-list.monospace.x-tibt", "Kailasa");
    +pref("font.name-list.monospace.x-tibt", "Dejavu Sans Mono");
664
     pref("font.name.serif.x-unicode", "Times");
666  pref("font.name.sans-serif.x-unicode", "Helvetica");
    -pref("font.name.monospace.x-unicode", "Courier");
668 +pref("font.name.monospace.x-unicode", "Dejavu Sans Mono");
     pref("font.name.cursive.x-unicode", "Apple Chancery");
670  pref("font.name.fantasy.x-unicode", "Papyrus");
     pref("font.name-list.serif.x-unicode", "Times");
672  pref("font.name-list.sans-serif.x-unicode", "Helvetica");
    -pref("font.name-list.monospace.x-unicode", "Courier");
674 +pref("font.name-list.monospace.x-unicode", "Dejavu Sans Mono");
     pref("font.name-list.cursive.x-unicode", "Apple Chancery");
676  pref("font.name-list.fantasy.x-unicode", "Papyrus");

678  pref("font.name.serif.x-western", "Times");
     pref("font.name.sans-serif.x-western", "Helvetica");
680 -pref("font.name.monospace.x-western", "Courier");
    +pref("font.name.monospace.x-western", "Dejavu Sans Mono");
682  pref("font.name.cursive.x-western", "Apple Chancery");
     pref("font.name.fantasy.x-western", "Papyrus");
684  pref("font.name-list.serif.x-western", "Times,Times New Roman");
     pref("font.name-list.sans-serif.x-western", "Helvetica,Arial");
686 -pref("font.name-list.monospace.x-western", "Courier,Courier New");
    +pref("font.name-list.monospace.x-western", "Dejavu Sans Mono");
688  pref("font.name-list.cursive.x-western", "Apple Chancery");
     pref("font.name-list.fantasy.x-western", "Papyrus");
690
     pref("font.name.serif.zh-CN", "Times");
692  pref("font.name.sans-serif.zh-CN", "Helvetica");
    -pref("font.name.monospace.zh-CN", "Courier");
694 +pref("font.name.monospace.zh-CN", "Dejavu Sans Mono");
     pref("font.name-list.serif.zh-CN", "Times,STSong,Heiti SC");
696  pref("font.name-list.sans-serif.zh-CN", "Helvetica,STHeiti,Heiti SC");
    -pref("font.name-list.monospace.zh-CN", "Courier,STHeiti,Heiti SC");
698 +pref("font.name-list.monospace.zh-CN", "Dejavu Sans Mono");

700  pref("font.name.serif.zh-TW", "Times");
     pref("font.name.sans-serif.zh-TW", "Helvetica");
702 -pref("font.name.monospace.zh-TW", "Courier");
    +pref("font.name.monospace.zh-TW", "Dejavu Sans Mono");
704  pref("font.name-list.serif.zh-TW", "Times,LiSong Pro,Heiti TC");
     pref("font.name-list.sans-serif.zh-TW", "Helvetica,Heiti TC,LiHei Pro")
         ;
706 -pref("font.name-list.monospace.zh-TW", "Courier,Heiti TC,LiHei Pro");
    +pref("font.name-list.monospace.zh-TW", "Dejavu Sans Mono");
708
```

```
 pref("font.name.serif.zh-HK", "Times");
710  pref("font.name.sans-serif.zh-HK", "Helvetica");
-pref("font.name.monospace.zh-HK", "Courier");
712 +pref("font.name.monospace.zh-HK", "Dejavu Sans Mono");
 pref("font.name-list.serif.zh-HK", "Times,LiSong Pro,Heiti TC");
714  pref("font.name-list.sans-serif.zh-HK", "Helvetica,Heiti TC,LiHei Pro")
     ;
-pref("font.name-list.monospace.zh-HK", "Courier,Heiti TC,LiHei Pro");
716 +pref("font.name-list.monospace.zh-HK", "Dejavu Sans Mono");

718  // XP_MACOSX changes to default font sizes
 pref("font.minimum-size.th", 10);
720 @@ -3439,55 +3439,55 @@

722  // font names

724 -pref("font.size.fixed.ar", 12);
+pref("font.size.fixed.ar", 14);
726

 pref("font.name.serif.el", "serif");
728  pref("font.name.sans-serif.el", "sans-serif");
-pref("font.name.monospace.el", "monospace");
730 -pref("font.size.fixed.el", 12);
+pref("font.name.monospace.el", "Dejavu Sans Mono");
732 +pref("font.size.fixed.el", 14);

734  pref("font.name.serif.he", "serif");
 pref("font.name.sans-serif.he", "sans-serif");
736 -pref("font.name.monospace.he", "monospace");
-pref("font.size.fixed.he", 12);
738 +pref("font.name.monospace.he", "Dejavu Sans Mono");
+pref("font.size.fixed.he", 14);
740

 pref("font.name.serif.ja", "serif");
742  pref("font.name.sans-serif.ja", "sans-serif");
-pref("font.name.monospace.ja", "monospace");
744 +pref("font.name.monospace.ja", "Dejavu Sans Mono");

746  pref("font.name.serif.ko", "serif");
 pref("font.name.sans-serif.ko", "sans-serif");
748 -pref("font.name.monospace.ko", "monospace");
+pref("font.name.monospace.ko", "Dejavu Sans Mono");
750

 pref("font.name.serif.th", "serif");
752  pref("font.name.sans-serif.th", "sans-serif");
 pref("font.minimum-size.th", 13);
754 -pref("font.name.monospace.th", "monospace");
+pref("font.name.monospace.th", "Dejavu Sans Mono");
756

 pref("font.name.serif.x-cyrillic", "serif");
758  pref("font.name.sans-serif.x-cyrillic", "sans-serif");
-pref("font.name.monospace.x-cyrillic", "monospace");
760 -pref("font.size.fixed.x-cyrillic", 12);
+pref("font.name.monospace.x-cyrillic", "Dejavu Sans Mono");
```

```
762 +pref("font.size.fixed.x-cyrillic", 14);
764  pref("font.name.serif.x-unicode", "serif");
     pref("font.name.sans-serif.x-unicode", "sans-serif");
766 -pref("font.name.monospace.x-unicode", "monospace");
    -pref("font.size.fixed.x-unicode", 12);
768 +pref("font.name.monospace.x-unicode", "Dejavu Sans Mono");
    +pref("font.size.fixed.x-unicode", 14);
770
     pref("font.name.serif.x-western", "serif");
772  pref("font.name.sans-serif.x-western", "sans-serif");
    -pref("font.name.monospace.x-western", "monospace");
774 -pref("font.size.fixed.x-western", 12);
    +pref("font.name.monospace.x-western", "Dejavu Sans Mono");
776 +pref("font.size.fixed.x-western", 14);
778  pref("font.name.serif.zh-CN", "serif");
     pref("font.name.sans-serif.zh-CN", "sans-serif");
780 -pref("font.name.monospace.zh-CN", "monospace");
    +pref("font.name.monospace.zh-CN", "Dejavu Sans Mono");
782
     // ming_uni.ttf (HKSCS-2001)
784  // http://www.info.gov.hk/digital21/eng/hkscs/download/uime.exe
     pref("font.name.serif.zh-HK", "serif");
786  pref("font.name.sans-serif.zh-HK", "sans-serif");
    -pref("font.name.monospace.zh-HK", "monospace");
788 +pref("font.name.monospace.zh-HK", "Dejavu Sans Mono");
790  // zh-TW
792 @@ -3523,21 +3523,21 @@
794  #if defined(ANDROID) || defined(MOZ_B2G)
796 -pref("font.size.fixed.ar", 12);
    +pref("font.size.fixed.ar", 14);
798
     pref("font.default.el", "sans-serif");
800 -pref("font.size.fixed.el", 12);
    +pref("font.size.fixed.el", 14);
802
    -pref("font.size.fixed.he", 12);
804 +pref("font.size.fixed.he", 14);
806  pref("font.default.x-cyrillic", "sans-serif");
    -pref("font.size.fixed.x-cyrillic", 12);
808 +pref("font.size.fixed.x-cyrillic", 14);
810  pref("font.default.x-unicode", "sans-serif");
    -pref("font.size.fixed.x-unicode", 12);
812 +pref("font.size.fixed.x-unicode", 14);
814  pref("font.default.x-western", "sans-serif");
    -pref("font.size.fixed.x-western", 12);
```

```
816 +pref("font.size.fixed.x-western", 14);

818  # ANDROID || MOZ_B2G
     #endif
820 @@ -3551,53 +3551,53 @@

822  pref("font.name.serif.el", "Droid Serif"); // not Charis SIL Compact,
         only has a few Greek chars
     pref("font.name.sans-serif.el", "Fira Sans");
824 -pref("font.name.monospace.el", "Fira Mono");
    +pref("font.name.monospace.el", "Dejavu Sans Mono");
826
     pref("font.name.serif.he", "Charis SIL Compact");
828  pref("font.name.sans-serif.he", "Fira Sans");
    -pref("font.name.monospace.he", "Fira Mono");
830 +pref("font.name.monospace.he", "Dejavu Sans Mono");
     pref("font.name-list.sans-serif.he", "Droid Sans Hebrew, Fira Sans");
832
     pref("font.name.serif.ja", "Charis SIL Compact");
834  pref("font.name.sans-serif.ja", "Fira Sans");
    -pref("font.name.monospace.ja", "MotoyaLMaru");
836 +pref("font.name.monospace.ja", "Dejavu Sans Mono");
     pref("font.name-list.sans-serif.ja", "Fira Sans, MotoyaLMaru,
         MotoyaLCedar, Droid Sans Japanese");
838 -pref("font.name-list.monospace.ja", "MotoyaLMaru, MotoyaLCedar, Fira
        Mono");
    +pref("font.name-list.monospace.ja", "Dejavu Sans Mono");
840
     pref("font.name.serif.ko", "Charis SIL Compact");
842  pref("font.name.sans-serif.ko", "Fira Sans");
    -pref("font.name.monospace.ko", "Fira Mono");
844 +pref("font.name.monospace.ko", "Dejavu Sans Mono");

846  pref("font.name.serif.th", "Charis SIL Compact");
     pref("font.name.sans-serif.th", "Fira Sans");
848 -pref("font.name.monospace.th", "Fira Mono");
    +pref("font.name.monospace.th", "Dejavu Sans Mono");
850  pref("font.name-list.sans-serif.th", "Fira Sans, Noto Sans Thai, Droid
         Sans Thai");

852  pref("font.name.serif.x-cyrillic", "Charis SIL Compact");
     pref("font.name.sans-serif.x-cyrillic", "Fira Sans");
854 -pref("font.name.monospace.x-cyrillic", "Fira Mono");
    +pref("font.name.monospace.x-cyrillic", "Dejavu Sans Mono");
856
     pref("font.name.serif.x-unicode", "Charis SIL Compact");
858  pref("font.name.sans-serif.x-unicode", "Fira Sans");
    -pref("font.name.monospace.x-unicode", "Fira Mono");
860 +pref("font.name.monospace.x-unicode", "Dejavu Sans Mono");

862  pref("font.name.serif.x-western", "Charis SIL Compact");
     pref("font.name.sans-serif.x-western", "Fira Sans");
864 -pref("font.name.monospace.x-western", "Fira Mono");
    +pref("font.name.monospace.x-western", "Dejavu Sans Mono");
```

```
866
 pref("font.name.serif.zh-CN", "Charis SIL Compact");
868  pref("font.name.sans-serif.zh-CN", "Fira Sans");
-pref("font.name.monospace.zh-CN", "Fira Mono");
870 +pref("font.name.monospace.zh-CN", "Dejavu Sans Mono");
 pref("font.name-list.sans-serif.zh-CN", "Fira Sans,Droid Sans Fallback"
     );
872
 pref("font.name.serif.zh-HK", "Charis SIL Compact");
874  pref("font.name.sans-serif.zh-HK", "Fira Sans");
-pref("font.name.monospace.zh-HK", "Fira Mono");
876 +pref("font.name.monospace.zh-HK", "Dejavu Sans Mono");
 pref("font.name-list.sans-serif.zh-HK", "Fira Sans,Droid Sans Fallback"
     );
878
 pref("font.name.serif.zh-TW", "Charis SIL Compact");
880  pref("font.name.sans-serif.zh-TW", "Fira Sans");
-pref("font.name.monospace.zh-TW", "Fira Mono");
882 +pref("font.name.monospace.zh-TW", "Dejavu Sans Mono");
 pref("font.name-list.sans-serif.zh-TW", "Fira Sans,Droid Sans Fallback"
     );
884
 #elif defined(ANDROID)
886 @@ -3607,71 +3607,71 @@

888  pref("font.name.serif.el", "Droid Serif"); // not Charis SIL Compact,
     only has a few Greek chars
 pref("font.name.sans-serif.el", "Clear Sans");
890 -pref("font.name.monospace.el", "Droid Sans Mono");
+pref("font.name.monospace.el", "Dejavu Sans Mono");
892  pref("font.name-list.sans-serif.el", "Clear Sans, Roboto, Droid Sans");

894  pref("font.name.serif.he", "Droid Serif");
 pref("font.name.sans-serif.he", "Clear Sans");
896 -pref("font.name.monospace.he", "Droid Sans Mono");
+pref("font.name.monospace.he", "Dejavu Sans Mono");
898  pref("font.name-list.sans-serif.he", "Droid Sans Hebrew, Clear Sans,
     Droid Sans");

900  pref("font.name.serif.ja", "Charis SIL Compact");
 pref("font.name.sans-serif.ja", "Clear Sans");
902 -pref("font.name.monospace.ja", "MotoyaLMaru");
+pref("font.name.monospace.ja", "Dejavu Sans Mono");
904  pref("font.name-list.serif.ja", "Droid Serif");
 pref("font.name-list.sans-serif.ja", "Clear Sans, Roboto, Droid Sans,
     MotoyaLMaru, MotoyaLCedar, Noto Sans JP, Droid Sans Japanese");
906 -pref("font.name-list.monospace.ja", "MotoyaLMaru, MotoyaLCedar, Droid
    Sans Mono");
+pref("font.name-list.monospace.ja", "Dejavu Sans Mono");
908
 pref("font.name.serif.ko", "Charis SIL Compact");
910  pref("font.name.sans-serif.ko", "Clear Sans");
-pref("font.name.monospace.ko", "Droid Sans Mono");
912 +pref("font.name.monospace.ko", "Dejavu Sans Mono");
```

```
 pref("font.name-list.serif.ko", "Droid Serif, HYSerif");
914 pref("font.name-list.sans-serif.ko", "SmartGothic, NanumGothic, Noto
      Sans KR, DroidSansFallback, Droid Sans Fallback");

916 pref("font.name.serif.th", "Charis SIL Compact");
 pref("font.name.sans-serif.th", "Clear Sans");
918 -pref("font.name.monospace.th", "Droid Sans Mono");
+pref("font.name.monospace.th", "Dejavu Sans Mono");
920 pref("font.name-list.serif.th", "Droid Serif");
 pref("font.name-list.sans-serif.th", "Droid Sans Thai, Clear Sans,
      Droid Sans");
922
 pref("font.name.serif.x-cyrillic", "Charis SIL Compact");
924 pref("font.name.sans-serif.x-cyrillic", "Clear Sans");
-pref("font.name.monospace.x-cyrillic", "Droid Sans Mono");
926 +pref("font.name.monospace.x-cyrillic", "Dejavu Sans Mono");
 pref("font.name-list.serif.x-cyrillic", "Droid Serif");
928 pref("font.name-list.sans-serif.x-cyrillic", "Clear Sans, Roboto, Droid
      Sans");

930 pref("font.name.serif.x-unicode", "Charis SIL Compact");
 pref("font.name.sans-serif.x-unicode", "Clear Sans");
932 -pref("font.name.monospace.x-unicode", "Droid Sans Mono");
+pref("font.name.monospace.x-unicode", "Dejavu Sans Mono");
934 pref("font.name-list.serif.x-unicode", "Droid Serif");
 pref("font.name-list.sans-serif.x-unicode", "Clear Sans, Roboto, Droid
      Sans");
936
 pref("font.name.serif.x-western", "Charis SIL Compact");
938 pref("font.name.sans-serif.x-western", "Clear Sans");
-pref("font.name.monospace.x-western", "Droid Sans Mono");
940 +pref("font.name.monospace.x-western", "Dejavu Sans Mono");
 pref("font.name-list.serif.x-western", "Droid Serif");
942 pref("font.name-list.sans-serif.x-western", "Clear Sans, Roboto, Droid
      Sans");

944 pref("font.name.serif.zh-CN", "Charis SIL Compact");
 pref("font.name.sans-serif.zh-CN", "Clear Sans");
946 -pref("font.name.monospace.zh-CN", "Droid Sans Mono");
+pref("font.name.monospace.zh-CN", "Dejavu Sans Mono");
948 pref("font.name-list.serif.zh-CN", "Droid Serif, Droid Sans Fallback");
 pref("font.name-list.sans-serif.zh-CN", "Roboto, Droid Sans, Noto Sans
      SC, Droid Sans Fallback");
950 -pref("font.name-list.monospace.zh-CN", "Droid Sans Fallback");
+pref("font.name-list.monospace.zh-CN", "Dejavu Sans Mono");
952
 pref("font.name.serif.zh-HK", "Charis SIL Compact");
954 pref("font.name.sans-serif.zh-HK", "Clear Sans");
-pref("font.name.monospace.zh-HK", "Droid Sans Mono");
956 +pref("font.name.monospace.zh-HK", "Dejavu Sans Mono");
 pref("font.name-list.serif.zh-HK", "Droid Serif, Droid Sans Fallback");
958 pref("font.name-list.sans-serif.zh-HK", "Roboto, Droid Sans, Noto Sans
      TC, Noto Sans SC, Droid Sans Fallback");
-pref("font.name-list.monospace.zh-HK", "Droid Sans Fallback");
```

```
+pref("font.name-list.monospace.zh-HK", "Dejavu Sans Mono");

 pref("font.name.serif.zh-TW", "Charis SIL Compact");
 pref("font.name.sans-serif.zh-TW", "Clear Sans");
-pref("font.name.monospace.zh-TW", "Droid Sans Mono");
+pref("font.name.monospace.zh-TW", "Dejavu Sans Mono");
 pref("font.name-list.serif.zh-TW", "Droid Serif, Droid Sans Fallback");
 pref("font.name-list.sans-serif.zh-TW", "Roboto, Droid Sans, Noto Sans
     TC, Noto Sans SC, Droid Sans Fallback");
-pref("font.name-list.monospace.zh-TW", "Droid Sans Fallback");
+pref("font.name-list.monospace.zh-TW", "Dejavu Sans Mono");

 #endif

@@ -3680,17 +3680,17 @@
 // Override default Japanese fonts
 pref("font.name.serif.ja", "dt-interface system-jisx0208.1983-0");
 pref("font.name.sans-serif.ja", "dt-interface system-jisx0208.1983-0");
-pref("font.name.monospace.ja", "dt-interface user-jisx0208.1983-0");
+pref("font.name.monospace.ja", "Dejavu Sans Mono");

 // Override default Cyrillic fonts
 pref("font.name.serif.x-cyrillic", "dt-interface system-iso8859-5");
 pref("font.name.sans-serif.x-cyrillic", "dt-interface system-iso8859-5"
     );
-pref("font.name.monospace.x-cyrillic", "dt-interface user-iso8859-5");
+pref("font.name.monospace.x-cyrillic", "Dejavu Sans Mono");

 // Override default Unicode fonts
 pref("font.name.serif.x-unicode", "dt-interface system-ucs2.cjk_japan-0
     ");
 pref("font.name.sans-serif.x-unicode", "dt-interface system-ucs2.
     cjk_japan-0");
-pref("font.name.monospace.x-unicode", "dt-interface user-ucs2.cjk_japan
    -0");
+pref("font.name.monospace.x-unicode", "Dejavu Sans Mono");

 # AIX
 #endif
```

18. toolkit 語系增加 en-US。

```
[dywang@dywnb SOURCES]$ echo en_US >> mozilla-esr38/toolkit/locales/all-
    locales
[dywang@dywnb SOURCES]$ diff -uN ../tmp/mozilla-esr38/toolkit/locales/
    all-locales \
mozilla-esr38/toolkit/locales/all-locales
--- ../tmp/mozilla-esr38/toolkit/locales/all-locales    2016-02-11
    04:59:03.000000000 +0800
+++ mozilla-esr38/toolkit/locales/all-locales   2016-03-10
    08:40:13.466275537 +0800
@@ -12,3 +12,4 @@
```

```
 ro
 sv-SE
 ru
+en_US
```

19. 增加 zh-TW 可用語系。

```
[dywang@dywnb SOURCES]$ vim mozilla-esr38/toolkit/locales/en-US/chrome/
    global/intl.properties
[dywang@dywnb SOURCES]$ diff -uN ../tmp/mozilla-esr38/toolkit/locales/en
    -US/chrome/\
global/intl.properties mozilla-esr38/toolkit/locales/en-US/chrome/global
    /intl.properties
--- ../tmp/mozilla-esr38/toolkit/locales/en-US/chrome/global/intl.
    properties    2016-02-11 04:59:03.000000000 +0800
+++ mozilla-esr38/toolkit/locales/en-US/chrome/global/intl.properties
    2016-03-10 08:42:34.862278700 +0800
@@ -30,7 +30,7 @@
 # British English in their list, since those languages are commonly
     spoken in
 # the same area as Breton:
 # intl.accept_languages=br, fr-FR, fr, en-GB, en
-intl.accept_languages=en-US, en
+intl.accept_languages=en-US, en, zh-TW

 # LOCALIZATION NOTE (font.language.group):
 # This preference controls the initial setting of the language drop-
     down menu
```

20. 系統預設使用 UTF-8 編碼。

```
[dywang@dywnb SOURCES]$ diff -uN ../tmp/mozilla-esr38/toolkit/locales/en
    -US/chrome/\
global-platform/unix/intl.properties \
mozilla-esr38/toolkit/locales/en-US/chrome/global-platform/unix/intl.
    properties
--- ../tmp/mozilla-esr38/toolkit/locales/en-US/chrome/global-platform/
    unix/intl.properties  2016-02-11 04:59:03.000000000 +0800
+++ mozilla-esr38/toolkit/locales/en-US/chrome/global-platform/unix/intl
    .properties 2016-03-10 08:45:44.049282932 +0800
@@ -4,4 +4,4 @@

 # LOCALIZATION NOTE (intl.ellipsis): Use the unicode ellipsis char, \
     u2026,
 # or use "..." if \u2026 doesn't suit traditions in your locale.
-intl.ellipsis=…
+intl.charset.default=UTF-8
```

21. 修改預設首頁到個人網頁。

```
[dywang@dywnb SOURCES]$ sed -i 's|\(startup.homepage.*\",\ *\"\).*\"|\1
    http://dywang.csie.cyut.edu.tw\"|g' \
firefox-redhat-default-prefs.js | grep homepage
[dywang@dywnb SOURCES]$ diff -uN ../tmp/firefox-redhat-default-prefs.js
    firefox-redhat-default-prefs.js
--- ../tmp/firefox-redhat-default-prefs.js  2016-02-11
    16:56:44.000000000 +0800
+++ firefox-redhat-default-prefs.js 2016-03-10 09:04:30.301308126 +0800
@@ -14,10 +14,10 @@
 pref("dom.ipc.plugins.enabled.nswrapper*",  false);
 pref("network.manage-offline-status",       true);
 pref("toolkit.networkmanager.disable",      false);
-pref("browser.startup.homepage",            "data:text/plain,browser.
    startup.homepage=file:///usr/share/doc/HTML/index.html");
+pref("browser.startup.homepage",            "http://dywang.csie.cyut.
    edu.tw");
 pref("toolkit.storage.synchronous",         0);
-pref("startup.homepage_override_url",       "http://www.redhat.com");
-pref("startup.homepage_welcome_url",        "http://www.redhat.com");
+pref("startup.homepage_override_url",       "http://dywang.csie.cyut.
    edu.tw");
+pref("startup.homepage_welcome_url",        "http://dywang.csie.cyut.
    edu.tw");
 /* Workaround for rhbz#1134876 */
 pref("javascript.options.baselinejit",      true);
 pref("extensions.shownSelectionUI",         true);
```

22. 重新打包壓縮 mozilla-esr31 目錄。

```
[dywang@dywnb SOURCES]$ tar jcvf firefox-38.6.1esr.source.tar.bz2
    mozilla-esr38
```

23. 建立 RPM 二進位檔，出現相依套件問題，不同的建立環境缺的套件不會相同，必須把缺的套件都安裝起來。

```
[dywang@dywnb SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
    SPECS/firefox.spec
Building target platforms: x86_64
Building for target x86_64
error: Failed build dependencies:
    nspr-devel >= 4.10.8-2 is needed by firefox-38.6.1-1.el6.dyw.x86_64
    nss-devel >= 3.19.1-5 is needed by firefox-38.6.1-1.el6.dyw.x86_64
    libvpx-devel >= 1.3.0 is needed by firefox-38.6.1-1.el6.dyw.x86_64
    hunspell-devel is needed by firefox-38.6.1-1.el6.dyw.x86_64
    bzip2-devel is needed by firefox-38.6.1-1.el6.dyw.x86_64
    libIDL-devel is needed by firefox-38.6.1-1.el6.dyw.x86_64
```

```
    gnome-vfs2-devel is needed by firefox-38.6.1-1.el6.dyw.x86_64
    libgnome-devel is needed by firefox-38.6.1-1.el6.dyw.x86_64
    libgnomeui-devel is needed by firefox-38.6.1-1.el6.dyw.x86_64
    krb5-devel is needed by firefox-38.6.1-1.el6.dyw.x86_64
    startup-notification-devel is needed by firefox-38.6.1-1.el6.dyw.
        x86_64
    libnotify-devel is needed by firefox-38.6.1-1.el6.dyw.x86_64
    autoconf213 is needed by firefox-38.6.1-1.el6.dyw.x86_64
    mesa-libGL-devel is needed by firefox-38.6.1-1.el6.dyw.x86_64
    python-simplejson is needed by firefox-38.6.1-1.el6.dyw.x86_64
    pulseaudio-libs-devel is needed by firefox-38.6.1-1.el6.dyw.x86_64
    openssl-devel is needed by firefox-38.6.1-1.el6.dyw.x86_64
    glibc-static is needed by firefox-38.6.1-1.el6.dyw.x86_64
    dejagnu is needed by firefox-38.6.1-1.el6.dyw.x86_64
    bison is needed by firefox-38.6.1-1.el6.dyw.x86_64
    flex is needed by firefox-38.6.1-1.el6.dyw.x86_64
    texinfo is needed by firefox-38.6.1-1.el6.dyw.x86_64
    sharutils is needed by firefox-38.6.1-1.el6.dyw.x86_64
    elfutils-devel >= 0.147 is needed by firefox-38.6.1-1.el6.dyw.x86_64
    elfutils-libelf-devel >= 0.147 is needed by firefox-38.6.1-1.el6.dyw
        .x86_64
    /lib/libc.so.6 is needed by firefox-38.6.1-1.el6.dyw.x86_64
    /usr/lib/libc.so is needed by firefox-38.6.1-1.el6.dyw.x86_64
    gmp-devel >= 4.1.2-8 is needed by firefox-38.6.1-1.el6.dyw.x86_64
    mpfr-devel >= 2.2.1 is needed by firefox-38.6.1-1.el6.dyw.x86_64
```

24. 安裝 firefox 開發相依套件。

```
[dywang@dywnb SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) \
../SPECS/firefox.spec 2>&1 | grep 'is need' | awk '{print $1}'
nspr-devel
nss-devel
libvpx-devel
hunspell-devel
bzip2-devel
libIDL-devel
gnome-vfs2-devel
libgnomeui-devel
krb5-devel
startup-notification-devel
libnotify-devel
autoconf213
mesa-libGL-devel
python-simplejson
pulseaudio-libs-devel
openssl-devel
glibc-static
dejagnu
bison
flex
texinfo
sharutils
```

```
25 elfutils-devel
   elfutils-libelf-devel
27 /lib/libc.so.6
   /usr/lib/libc.so
29 gmp-devel
   mpfr-devel
31
   [dywang@dywnb SOURCES]$ packages=$(rpmbuild -ba --clean --target=$(uname
       -m) \
33 ../SPECS/firefox.spec 2>&1 | grep 'is need' | awk '{print $1}' | grep -v
       '/')
   [dywang@dywnb SOURCES]$ yum install $packages --enablerepo=centos
```

25. 再同時建立 RPM 及 SRPM 二進位檔字，還需要 libc.so.6 及 libc.so 函式，經查爲 glibc.i686 套件提供，再安裝此套件。

```
   [dywang@dywnb SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
       SPECS/firefox.spec
2  Building target platforms: x86_64
   Building for target x86_64
4  error: Failed build dependencies:
       /lib/libc.so.6 is needed by firefox-38.6.1-1.el6.dyw.x86_64
6      /usr/lib/libc.so is needed by firefox-38.6.1-1.el6.dyw.x86_64
   [dywang@dywnb SOURCES]$ yum provides /lib/libc.so.6
8  Loaded plugins: fastestmirror, priorities, refresh-packagekit
   Determining fastest mirrors
10 dywang/filelists_db                                      | 2.7 MB
       00:00
   glibc-2.12-1.166.el6.i686 : The GNU libc libraries
12 Repo        : dywang
   Matched from:
14 Filename    : /lib/libc.so.6

16 [dywang@dywnb SOURCES]$ sudo yum install glibc.i686 glibc-devel.i686 --
       enablerepo=centos
```

26. 再同時建立 RPM 及 SRPM 二進位檔字，firefox RPM 建立要 1 小時以上，要耐心等候。成功建立的訊息最後幾行，看到產生 firefox firefox-debuginfo 二個 RPM 檔及一個 firefox SRPM 檔。

```
   [dywang@dywnb SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
       SPECS/firefox.spec
2  ..................
   Processing files: firefox-debuginfo-38.6.1-1.el6.dyw.x86_64
4  Checking for unpackaged file(s): /usr/lib/rpm/check-files /home/dywang/
       rpmbuild/BUILDROOT/firefox-38.6.1-1.el6.dyw.x86_64
   Wrote: /home/dywang/rpmbuild/SRPMS/firefox-38.6.1-1.el6.dyw.src.rpm
```

```
Wrote: /home/dywang/rpmbuild/RPMS/x86_64/firefox-38.6.1-1.el6.dyw.x86_64
    .rpm
Wrote: /home/dywang/rpmbuild/RPMS/x86_64/firefox-debuginfo-38.6.1-1.el6.
    dyw.x86_64.rpm
Executing(%clean): /bin/sh -e /var/tmp/rpm-tmp.iuECBX
+ umask 022
+ cd /home/dywang/rpmbuild/BUILD
+ cd firefox-38.6.1
+ /bin/rm -rf /home/dywang/rpmbuild/BUILDROOT/firefox-38.6.1-1.el6.dyw.
    x86_64
+ exit 0
Executing(--clean): /bin/sh -e /var/tmp/rpm-tmp.fwBTuo
+ umask 022
+ cd /home/dywang/rpmbuild/BUILD
+ rm -rf firefox-38.6.1
+ exit 0
```

27. 啓動 firefox 出現以下錯誤訊息：

```
[dywang@dyw219 ~]$ firefox
console.error:
  [CustomizableUI]
  Custom widget with id loop-button does not return a valid node
console.error:
  [CustomizableUI]
  Custom widget with id loop-button does not return a valid node
hashcompleter: cancelling request to https://safebrowsing.google.com/
    safebrowsing/gethash?client=navclient-auto-ffox&appver=38.0.1&pver
    =2.2
hashcompleter: notifying failure
hashcompleter: Can't make request to https://safebrowsing.google.com/
    safebrowsing/gethash?client=navclient-auto-ffox&appver=38.0.1&pver
    =2.2
hashcompleter: notifying failure
```

28. 在 firefox 網址列輸入 about:config，將 loop.enabled 改成 true，可解決上述問題。

```
loop.enabled ===== true
```

18.14 firefox-45 套件實例

1. 緣由：firefox v38.6 某些網頁還是會當掉。

2. v45 firefox hello 視訊 (video+audio) 包含文字聊天室，但文字有部分遺漏待處理。

3. v38 facebook 中文輸入有問題，v45 已解決此問題。

4. v45 必須修改字型設定，註解以下部分，否則網頁細明體字不夠清楚。

```
[dywang@dywnb ~]$ tail -29 .fonts.conf
<!--處理楷體>
<match target="font">
        <test qual="any" name="family" compare="eq">
                <string>AR PL UKai TW</string>
                <string>AR PL UKai CN</string>
        </test>
        <test name="pixelsize" compare="more_eq">
                <double>12</double>
        </test>
        <test name="pixelsize" compare="less_eq">
                <double>16</double>
        </test>
        <edit name="antialias" mode="assign">
                <bool>ture</bool>
        </edit>
</match>

<match target="pattern">
        <test name="family" compare="eq">
                <string>AR PL UMing TW</string>
                <string>AR PL UMing CN</string>
                <string>AR PL UKai TW</string>
                <string>AR PL UKai CN</string>
        </test>
        <edit name="family" mode="prepend" binding="strong">
                <string>DejaVu Sans</string>
        </edit>
</match-->
</fontconfig>
```

5. 下載 SRPM 套件

```
[dywang@dywnb ~]$ cd rpmbuild
[dywang@dywnb rpmbuild]$ wget ftp://bo.mirror.garr.it/2/scientific/6x/\
SRPMS/vendor/firefox-45.1.0-1.el6_7.src.rpm
```

6. 安裝 SRPM 套件

```
[dywang@dywnb rpmbuild]$ rpm -ivh firefox-45.1.0-1.el6_7.src.rpm
```

```
warning: firefox-45.1.0-1.el6_7.src.rpm: Header V4 DSA/SHA1 Signature,
    key ID 192a7d7d: NOKEY
3   1:firefox               ##########################################
       [100%]
```

7. 查看安裝的所有檔案。

```
1   [dywang@dywnb rpmbuild]$ cd SOURCES/
    [dywang@dywnb SOURCES]$  rpm -qpl ../firefox-45.1.0-1.el6_7.src.rpm
3   warning: ../firefox-45.1.0-1.el6_7.src.rpm: Header V4 DSA/SHA1 Signature
        , key ID 192a7d7d: NOKEY
    Python-2.7.8.tgz
5   aarch64-fix-skia.patch
    build-el5-build-id.patch
7   build-el5-fontconfig.patch
    build-el5-gtk2-2.10.patch
9   build-el5-nss.patch
    build-el5-rapl.patch
11  build-el5-rt-tgsigqueueinfo.patch
    build-el5-sandbox.patch
13  build-el5-stdint.patch
    build-el5-xlib-header.patch
15  build-nss.patch
    devtoolset-2-binutils-2.23.52.0.1-10.el5.src.rpm
17  find-external-requires
    firefox-45.1.0esr.source.tar.xz
19  firefox-default.patch
    firefox-enable-addons.patch
21  firefox-enable-plugins.patch
    firefox-install-dir.patch
23  firefox-langpacks-45.1.0esr-20160421.tar.xz
    firefox-mozconfig
25  firefox-ppc64le.patch
    firefox-redhat-default-bookmarks.html
27  firefox-redhat-default-prefs.js
    firefox.1
29  firefox.desktop
    firefox.sh.in.rhel5
31  firefox.sh.in.rhel6
    firefox.sh.in.rhel7
33  firefox.spec
    gcc48-4.8.2-16.el5.src.rpm
35  mozilla-1005535.patch
    mozilla-1152515.patch
37  mozilla-1170092-etc-conf.patch
    mozilla-1253216-disable-ion.patch
39  mozilla-1266366-branch64.patch
    mozilla-api-key
41  rhbz-966424.patch
    webrtc-arch-cpu.patch
43  xulrunner-24.0-jemalloc-ppc.patch
    yasm-1.2.0-3.el5.src.rpm
```

8. 查看程式主要的打包壓縮檔。

```
[dywang@dywnb SOURCES]$ ls firefox-45.1.0esr.source.tar.xz
firefox-45.1.0esr.source.tar.xz
```

9. 解壓縮原始碼 tarball，產生 firefox-45.1.0esr 目錄，存放原始碼。

```
[dywang@dywnb SOURCES]$ tar xJvf firefox-45.1.0esr.source.tar.xz
```

10. 查看 firefox-45.1.0esr 目錄內的檔案。

```
[dywang@dywnb SOURCES]$ ls firefox-45.1.0esr
accessible    devtools           LICENSE              README.txt
aclocal.m4    docshell           mach                 release
addon-sdk     dom                Makefile.in          security
Android.mk    editor             media                services
AUTHORS       embedding          memory               settings.gradle
b2g           extensions         mfbt                 startupcache
browser       gfx                mobile               storage
build         GNUmakefile        modules              testing
build.gradle  gradle             moz.build            test.mozbuild
caps          gradle.properties  mozglue              toolkit
chrome        gradlew            mozilla-config.h.in  tools
client.mk     hal                netwerk              uriloader
client.py     image              nsprpub              view
CLOBBER       intl               other-licenses       webapprt
config        ipc                parser               widget
configure     js                 probes               xpcom
configure.in  layout             python               xpfe
db            LEGAL              rdf                  xulrunner
```

11. 進入暫存目錄 tmp，解開原始 src.rpm，方便做修改的比對。

```
[dywang@dywnb SOURCES]$ cd ../tmp/
[dywang@dywnb tmp]$ rm ./* -rf
[dywang@dywnb tmp]$ rpm2cpio ../firefox-45.1.0-1.el6_7.src.rpm | cpio -
    idvm
Python-2.7.8.tgz
aarch64-fix-skia.patch
build-el5-build-id.patch
build-el5-fontconfig.patch
build-el5-gtk2-2.10.patch
```

```
build-el5-nss.patch
build-el5-rapl.patch
build-el5-rt-tgsigqueueinfo.patch
build-el5-sandbox.patch
build-el5-stdint.patch
build-el5-xlib-header.patch
build-nss.patch
devtoolset-2-binutils-2.23.52.0.1-10.el5.src.rpm
find-external-requires
firefox-45.1.0esr.source.tar.xz
firefox-default.patch
firefox-enable-addons.patch
firefox-enable-plugins.patch
firefox-install-dir.patch
firefox-langpacks-45.1.0esr-20160421.tar.xz
firefox-mozconfig
firefox-ppc64le.patch
firefox-redhat-default-bookmarks.html
firefox-redhat-default-prefs.js
firefox.1
firefox.desktop
firefox.sh.in.rhel5
firefox.sh.in.rhel6
firefox.sh.in.rhel7
firefox.spec
gcc48-4.8.2-16.el5.src.rpm
mozilla-1005535.patch
mozilla-1152515.patch
mozilla-1170092-etc-conf.patch
mozilla-1253216-disable-ion.patch
mozilla-1266366-branch64.patch
mozilla-api-key
rhbz-966424.patch
webrtc-arch-cpu.patch
xulrunner-24.0-jemalloc-ppc.patch
yasm-1.2.0-3.el5.src.rpm
690576 blocks
```

12. 暫存目錄下解開 firefox-45.1.0esr.source.tar.xz。

```
[dywang@dywnb tmp]$ tar Jxvf firefox-45.1.0esr.source.tar.xz
```

13. 修改 RPM spec 規格檔，版本加入 dyw。

```
[dywang@dywnb SOURCES]$ vim ../SPECS/firefox.spec
[dywang@dywnb SOURCES]$ diff -uN ../tmp/firefox.spec ../SPECS/firefox.
    spec
--- ../tmp/firefox.spec 2016-04-22 02:43:16.000000000 +0800
+++ ../SPECS/firefox.spec   2016-05-30 10:29:19.324178457 +0800
```

```
@@ -90,7 +90,7 @@
 Summary:        Mozilla Firefox Web browser
 Name:           firefox
 Version:        45.1.0
-Release:        1%{?dist}
+Release:        1%{?dist}.dyw
 URL:            http://www.mozilla.org/projects/firefox/
 License:        MPLv1.1 or GPLv2+ or LGPLv2+
 Group:          Applications/Internet
```

14. 修改其他編碼爲 UTF-8。

```
[dywang@dywnb SOURCES]$ vim firefox-45.1.0esr/browser/components/
    preferences/fonts.xul
[dywang@dywnb SOURCES]$ diff -uN ../tmp/firefox-45.1.0esr/browser/
    components/preferences/fonts.xul firefox-45.1.0esr/browser/
    components/preferences/fonts.xul
--- ../tmp/firefox-45.1.0esr/browser/components/preferences/fonts.xul
    2016-04-21 05:32:52.000000000 +0800
+++ firefox-45.1.0esr/browser/components/preferences/fonts.xul
    2016-05-30 10:31:37.550181549 +0800
@@ -270,7 +270,7 @@
             <menuitem label="&languages.customize.Fallback.thai;"
                       value="windows-874"/>
             <menuitem label="&languages.customize.Fallback.turkish;"
                       value="windows-1254"/>
             <menuitem label="&languages.customize.Fallback.vietnamese;"
                       value="windows-1258"/>
-            <menuitem label="&languages.customize.Fallback.other;"
          value="windows-1252"/>
+            <menuitem label="&languages.customize.Fallback.other;"
          value="UTF-8"/>
           </menupopup>
         </menulist>
       </hbox>
```

15. 增加瀏覽器語系 en-US。

```
[dywang@dywnb SOURCES]$ vim firefox-45.1.0esr/browser/locales/all-
    locales
[dywang@dywnb SOURCES]$ diff -uN ../tmp/firefox-45.1.0esr/browser/
    locales/all-locales firefox-45.1.0esr/browser/locales/all-locales
--- ../tmp/firefox-45.1.0esr/browser/locales/all-locales    2016-04-21
    05:32:53.000000000 +0800
+++ firefox-45.1.0esr/browser/locales/all-locales   2016-05-30
    10:34:01.635184773 +0800
@@ -19,6 +19,7 @@
 de
 dsb
```

```
 el
+en-US
 en-GB
 en-ZA
 eo
```

16. 當找不到編碼時預設使用 UTF-8。

```
[dywang@dywnb SOURCES]$ vim firefox-45.1.0esr/dom/encoding/
    FallbackEncoding.cpp
[dywang@dywnb SOURCES]$ sed -i 's/windows-1252/UTF-8/g' firefox-45.1.0
    esr/dom/encoding/FallbackEncoding.cpp
[dywang@dywnb SOURCES]$ diff -uN ../tmp/firefox-45.1.0esr/dom/encoding/
    FallbackEncoding.cpp firefox-45.1.0esr/dom/encoding/FallbackEncoding
    .cpp
--- ../tmp/firefox-45.1.0esr/dom/encoding/FallbackEncoding.cpp
    2016-04-21 05:33:00.000000000 +0800
+++ firefox-45.1.0esr/dom/encoding/FallbackEncoding.cpp 2016-05-30
    10:37:15.329189105 +0800
@@ -97,7 +97,7 @@

   if (NS_FAILED(nsUConvPropertySearch::SearchPropertyValue(
       localesFallbacks, ArrayLength(localesFallbacks), locale,
           mFallback))) {
-    mFallback.AssignLiteral("windows-1252");
+    mFallback.AssignLiteral("UTF-8");
   }

   aFallback = mFallback;
@@ -162,7 +162,7 @@
 {
   if (NS_FAILED(nsUConvPropertySearch::SearchPropertyValue(
       domainsFallbacks, ArrayLength(domainsFallbacks), aTLD, aFallback)
           )) {
-    aFallback.AssignLiteral("windows-1252");
+    aFallback.AssignLiteral("UTF-8");
   }
 }
```

17. unix 系統預設使用 UTF-8 編碼。

```
[dywang@dywnb SOURCES]$ vim firefox-45.1.0esr/intl/locale/unix/
    nsDateTimeFormatUnix.cpp
[dywang@dywnb SOURCES]$ sed -i 's/windows-1252/UTF-8/g' \
firefox-45.1.0esr/intl/locale/unix/nsDateTimeFormatUnix.cpp
```

18. 預設等寬字 monospace，實際使用時不會等寬，故修改成 DejaVu Sans Mono，並修改預設字型大小等寬字爲 14。

```
[dywang@dywnb SOURCES]$ vim firefox-45.1.0esr/modules//libpref/init/all.
    js
[dywang@dywnb SOURCES]$ sed -i 's/windows-1252/UTF-8/g' \
firefox-45.1.0esr/modules//libpref/init/all.js
[dywang@dywnb SOURCES]$ sed -i 's/\(font.size.fixed.*\)1[0-9]/\114/g' \
firefox-45.1.0esr/modules//libpref/init/all.js
[dywang@dywnb SOURCES]$ diff -uN ../tmp/firefox-45.1.0esr/modules//\
libpref/init/all.js \
firefox-45.1.0esr/modules//libpref/init/all.js
--- ../tmp/firefox-45.1.0esr/modules//libpref/init/all.js   2016-04-21
    05:33:05.000000000 +0800
+++ firefox-45.1.0esr/modules//libpref/init/all.js  2016-05-30
    10:41:22.165194627 +0800
@@ -1889,7 +1889,7 @@
 // fallback charset list for Unicode conversion (converting from
     Unicode)
 // currently used for mail send only to handle symbol characters (e.g
     Euro, trademark, smartquotes)
 // for ISO-8859-1
-pref("intl.fallbackCharsetList.ISO-8859-1", "windows-1252");
+pref("intl.fallbackCharsetList.ISO-8859-1", "UTF-8");
 pref("font.language.group",                 "chrome://global/locale/
     intl.properties");

 // Android-specific pref to use key-events-only mode for IME-unaware
     webapps.
@@ -2633,149 +2633,149 @@
 pref("font.default.ar", "sans-serif");
 pref("font.minimum-size.ar", 0);
 pref("font.size.variable.ar", 16);
-pref("font.size.fixed.ar", 13);
+pref("font.size.fixed.ar", 14);

 pref("font.default.el", "serif");
 pref("font.minimum-size.el", 0);
 pref("font.size.variable.el", 16);
-pref("font.size.fixed.el", 13);
+pref("font.size.fixed.el", 14);

 pref("font.default.he", "sans-serif");
 pref("font.minimum-size.he", 0);
 pref("font.size.variable.he", 16);
-pref("font.size.fixed.he", 13);
+pref("font.size.fixed.he", 14);

 pref("font.default.ja", "sans-serif");
 pref("font.minimum-size.ja", 0);
 pref("font.size.variable.ja", 16);
-pref("font.size.fixed.ja", 16);
+pref("font.size.fixed.ja", 14);
```

```
45  pref("font.default.ko", "sans-serif");
    pref("font.minimum-size.ko", 0);
47  pref("font.size.variable.ko", 16);
   -pref("font.size.fixed.ko", 16);
49 +pref("font.size.fixed.ko", 14);

51  pref("font.default.th", "sans-serif");
    pref("font.minimum-size.th", 0);
53  pref("font.size.variable.th", 16);
   -pref("font.size.fixed.th", 13);
55 +pref("font.size.fixed.th", 14);

57  pref("font.default.x-cyrillic", "serif");
    pref("font.minimum-size.x-cyrillic", 0);
59  pref("font.size.variable.x-cyrillic", 16);
   -pref("font.size.fixed.x-cyrillic", 13);
61 +pref("font.size.fixed.x-cyrillic", 14);

63  pref("font.default.x-devanagari", "serif");
    pref("font.minimum-size.x-devanagari", 0);
65  pref("font.size.variable.x-devanagari", 16);
   -pref("font.size.fixed.x-devanagari", 13);
67 +pref("font.size.fixed.x-devanagari", 14);

69  pref("font.default.x-tamil", "serif");
    pref("font.minimum-size.x-tamil", 0);
71  pref("font.size.variable.x-tamil", 16);
   -pref("font.size.fixed.x-tamil", 13);
73 +pref("font.size.fixed.x-tamil", 14);

75  pref("font.default.x-armn", "serif");
    pref("font.minimum-size.x-armn", 0);
77  pref("font.size.variable.x-armn", 16);
   -pref("font.size.fixed.x-armn", 13);
79 +pref("font.size.fixed.x-armn", 14);

81  pref("font.default.x-beng", "serif");
    pref("font.minimum-size.x-beng", 0);
83  pref("font.size.variable.x-beng", 16);
   -pref("font.size.fixed.x-beng", 13);
85 +pref("font.size.fixed.x-beng", 14);

87  pref("font.default.x-cans", "serif");
    pref("font.minimum-size.x-cans", 0);
89  pref("font.size.variable.x-cans", 16);
   -pref("font.size.fixed.x-cans", 13);
91 +pref("font.size.fixed.x-cans", 14);

93  pref("font.default.x-ethi", "serif");
    pref("font.minimum-size.x-ethi", 0);
95  pref("font.size.variable.x-ethi", 16);
   -pref("font.size.fixed.x-ethi", 13);
97 +pref("font.size.fixed.x-ethi", 14);
```

```
 pref("font.default.x-geor", "serif");
 pref("font.minimum-size.x-geor", 0);
 pref("font.size.variable.x-geor", 16);
-pref("font.size.fixed.x-geor", 13);
+pref("font.size.fixed.x-geor", 14);

 pref("font.default.x-gujr", "serif");
 pref("font.minimum-size.x-gujr", 0);
 pref("font.size.variable.x-gujr", 16);
-pref("font.size.fixed.x-gujr", 13);
+pref("font.size.fixed.x-gujr", 14);

 pref("font.default.x-guru", "serif");
 pref("font.minimum-size.x-guru", 0);
 pref("font.size.variable.x-guru", 16);
-pref("font.size.fixed.x-guru", 13);
+pref("font.size.fixed.x-guru", 14);

 pref("font.default.x-khmr", "serif");
 pref("font.minimum-size.x-khmr", 0);
 pref("font.size.variable.x-khmr", 16);
-pref("font.size.fixed.x-khmr", 13);
+pref("font.size.fixed.x-khmr", 14);

 pref("font.default.x-mlym", "serif");
 pref("font.minimum-size.x-mlym", 0);
 pref("font.size.variable.x-mlym", 16);
-pref("font.size.fixed.x-mlym", 13);
+pref("font.size.fixed.x-mlym", 14);

 pref("font.default.x-orya", "serif");
 pref("font.minimum-size.x-orya", 0);
 pref("font.size.variable.x-orya", 16);
-pref("font.size.fixed.x-orya", 13);
+pref("font.size.fixed.x-orya", 14);

 pref("font.default.x-telu", "serif");
 pref("font.minimum-size.x-telu", 0);
 pref("font.size.variable.x-telu", 16);
-pref("font.size.fixed.x-telu", 13);
+pref("font.size.fixed.x-telu", 14);

 pref("font.default.x-knda", "serif");
 pref("font.minimum-size.x-knda", 0);
 pref("font.size.variable.x-knda", 16);
-pref("font.size.fixed.x-knda", 13);
+pref("font.size.fixed.x-knda", 14);

 pref("font.default.x-sinh", "serif");
 pref("font.minimum-size.x-sinh", 0);
 pref("font.size.variable.x-sinh", 16);
-pref("font.size.fixed.x-sinh", 13);
+pref("font.size.fixed.x-sinh", 14);
```

```
153  pref("font.default.x-tibt", "serif");
     pref("font.minimum-size.x-tibt", 0);
155  pref("font.size.variable.x-tibt", 16);
    -pref("font.size.fixed.x-tibt", 13);
157 +pref("font.size.fixed.x-tibt", 14);

159  pref("font.default.x-unicode", "serif");
     pref("font.minimum-size.x-unicode", 0);
161  pref("font.size.variable.x-unicode", 16);
    -pref("font.size.fixed.x-unicode", 13);
163 +pref("font.size.fixed.x-unicode", 14);

165  pref("font.default.x-western", "serif");
     pref("font.minimum-size.x-western", 0);
167  pref("font.size.variable.x-western", 16);
    -pref("font.size.fixed.x-western", 13);
169 +pref("font.size.fixed.x-western", 14);

171  pref("font.default.zh-CN", "sans-serif");
     pref("font.minimum-size.zh-CN", 0);
173  pref("font.size.variable.zh-CN", 16);
    -pref("font.size.fixed.zh-CN", 16);
175 +pref("font.size.fixed.zh-CN", 14);

177  pref("font.default.zh-HK", "sans-serif");
     pref("font.minimum-size.zh-HK", 0);
179  pref("font.size.variable.zh-HK", 16);
    -pref("font.size.fixed.zh-HK", 16);
181 +pref("font.size.fixed.zh-HK", 14);

183  pref("font.default.zh-TW", "sans-serif");
     pref("font.minimum-size.zh-TW", 0);
185  pref("font.size.variable.zh-TW", 16);
    -pref("font.size.fixed.zh-TW", 16);
187 +pref("font.size.fixed.zh-TW", 14);

189  // mathml.css sets font-size to "inherit" and font-family to "serif" so
         only
     // font.name.*.x-math and font.minimum-size.x-math are really relevant.
191  pref("font.default.x-math", "serif");
     pref("font.minimum-size.x-math", 0);
193  pref("font.size.variable.x-math", 16);
    -pref("font.size.fixed.x-math", 13);
195 +pref("font.size.fixed.x-math", 14);

197  /*
      * A value greater than zero enables font size inflation for
199 @@ -3751,17 +3751,17 @@
     pref("font.name.serif.ar", "serif");
201  pref("font.name.sans-serif.ar", "sans-serif");
     pref("font.name.monospace.ar", "monospace");
203 -pref("font.size.fixed.ar", 12);
    +pref("font.size.fixed.ar", 14);
205
```

```
 pref("font.name.serif.el", "serif");
 pref("font.name.sans-serif.el", "sans-serif");
 pref("font.name.monospace.el", "monospace");
-pref("font.size.fixed.el", 12);
+pref("font.size.fixed.el", 14);

 pref("font.name.serif.he", "serif");
 pref("font.name.sans-serif.he", "sans-serif");
 pref("font.name.monospace.he", "monospace");
-pref("font.size.fixed.he", 12);
+pref("font.size.fixed.he", 14);

 pref("font.name.serif.ja", "serif");
 pref("font.name.sans-serif.ja", "sans-serif");
@@ -3791,7 +3791,7 @@
 pref("font.name.serif.x-cyrillic", "serif");
 pref("font.name.sans-serif.x-cyrillic", "sans-serif");
 pref("font.name.monospace.x-cyrillic", "monospace");
-pref("font.size.fixed.x-cyrillic", 12);
+pref("font.size.fixed.x-cyrillic", 14);

 pref("font.name.serif.x-devanagari", "serif");
 pref("font.name.sans-serif.x-devanagari", "sans-serif");
@@ -3848,12 +3848,12 @@
 pref("font.name.serif.x-unicode", "serif");
 pref("font.name.sans-serif.x-unicode", "sans-serif");
 pref("font.name.monospace.x-unicode", "monospace");
-pref("font.size.fixed.x-unicode", 12);
+pref("font.size.fixed.x-unicode", 14);

 pref("font.name.serif.x-western", "serif");
 pref("font.name.sans-serif.x-western", "sans-serif");
 pref("font.name.monospace.x-western", "monospace");
-pref("font.size.fixed.x-western", 12);
+pref("font.size.fixed.x-western", 14);

 pref("font.name.serif.zh-CN", "serif");
 pref("font.name.sans-serif.zh-CN", "sans-serif");
@@ -3907,21 +3907,21 @@
 #if defined(ANDROID) || defined(MOZ_B2G)

-pref("font.size.fixed.ar", 12);
+pref("font.size.fixed.ar", 14);

 pref("font.default.el", "sans-serif");
-pref("font.size.fixed.el", 12);
+pref("font.size.fixed.el", 14);

-pref("font.size.fixed.he", 12);
+pref("font.size.fixed.he", 14);

 pref("font.default.x-cyrillic", "sans-serif");
-pref("font.size.fixed.x-cyrillic", 12);
```

```
+pref("font.size.fixed.x-cyrillic", 14);

 pref("font.default.x-unicode", "sans-serif");
-pref("font.size.fixed.x-unicode", 12);
+pref("font.size.fixed.x-unicode", 14);

 pref("font.default.x-western", "sans-serif");
-pref("font.size.fixed.x-western", 12);
+pref("font.size.fixed.x-western", 14);

 # ANDROID || MOZ_B2G
 #endif
```

19. toolkit 語系增加 en-US。

```
[dywang@dywnb SOURCES]$ vim firefox-45.1.0esr/toolkit/locales/all-
    locales
[dywang@dywnb SOURCES]$ echo en-US >> firefox-45.1.0esr/toolkit/\
locales/all-locales
[dywang@dywnb SOURCES]$ diff -uN ../tmp/firefox-45.1.0esr/toolkit/\
locales/all-locales \
firefox-45.1.0esr/toolkit/locales/all-locales
--- ../tmp/firefox-45.1.0esr/toolkit/locales/all-locales    2016-04-21
    05:33:08.000000000 +0800
+++ firefox-45.1.0esr/toolkit/locales/all-locales   2016-05-30
    10:45:30.235200177 +0800
@@ -12,3 +12,4 @@
 ro
 sv-SE
 ru
+en-US
```

20. 增加 zh-TW 可用語系。

```
[dywang@dywnb SOURCES]$ vim firefox-45.1.0esr/toolkit/locales/en-US/\
chrome/global/intl.properties
[dywang@dywnb SOURCES]$ diff -uN ../tmp/firefox-45.1.0esr/toolkit/\
locales/en-US/chrome/global/intl.properties \
firefox-45.1.0esr/toolkit/locales/en-US/chrome/global/intl.properties
--- ../tmp/firefox-45.1.0esr/toolkit/locales/en-US/chrome/global/intl.
    properties2016-04-21 05:33:08.000000000 +0800
+++ firefox-45.1.0esr/toolkit/locales/en-US/chrome/global/intl.
    properties   2016-05-30 10:47:40.303203086 +0800
@@ -30,7 +30,7 @@
 # British English in their list, since those languages are commonly
     spoken in
 # the same area as Breton:
 # intl.accept_languages=br, fr-FR, fr, en-GB, en
-intl.accept_languages=en-US, en
```

```
13 +intl.accept_languages=en-US, en, zh-TW

15  # LOCALIZATION NOTE (font.language.group):
    # This preference controls the initial setting of the language drop-
       down menu
```

21. 系統預設使用 UTF-8 編碼。

```
[dywang@dywnb SOURCES]$ vim firefox-45.1.0esr/toolkit/locales/en-US/\
2 chrome/global-platform/unix/intl.properties
[dywang@dywnb SOURCES]$ echo 'intl.charset.default=UTF-8' >> \
4 firefox-45.1.0esr/toolkit/locales/en-US/chrome/global-platform/unix/intl
     .properties
[dywang@dywnb SOURCES]$ diff -uN ../tmp/firefox-45.1.0esr/toolkit/
     locales/\
6 en-US/chrome/global-platform/unix/intl.properties \
firefox-45.1.0esr/toolkit/locales/en-US/chrome/global-platform/unix/intl
     .properties
8 --- ../tmp/firefox-45.1.0esr/toolkit/locales/en-US/chrome/global-
     platform/unix/intl.properties  2016-04-21 05:33:08.000000000 +0800
+++ firefox-45.1.0esr/toolkit/locales/en-US/chrome/global-platform/unix/
     intl.properties 2016-05-30 10:51:45.661208575 +0800
10 @@ -5,3 +5,4 @@
  # LOCALIZATION NOTE (intl.ellipsis): Use the unicode ellipsis char, \
       u2026,
12  # or use "..." if \u2026 doesn't suit traditions in your locale.
  intl.ellipsis=…
14 +intl.charset.default=UTF-8
```

22. 修改預設首頁到個人網頁。

```
[dywang@dywnb SOURCES]$ vim firefox-redhat-default-prefs.js
2 [dywang@dywnb SOURCES]$ sed -i 's|\(startup.homepage.*\",\ *\"\).*\"|\1
     http://dywang.csie.cyut.edu.tw\"|g' \
firefox-redhat-default-prefs.js | grep homepage
4 [dywang@dywnb SOURCES]$ diff -uN ../tmp/firefox-redhat-default-prefs.js
     \
firefox-redhat-default-prefs.js
6 --- ../tmp/firefox-redhat-default-prefs.js  2016-04-22
     02:42:53.000000000 +0800
+++ firefox-redhat-default-prefs.js 2016-05-30 10:54:59.577212913 +0800
8 @@ -14,10 +14,10 @@
  pref("dom.ipc.plugins.enabled.nswrapper*",  false);
10  pref("network.manage-offline-status",       true);
  pref("toolkit.networkmanager.disable",      false);
12 -pref("browser.startup.homepage",           "data:text/plain,browser.
     startup.homepage=file:///usr/share/doc/HTML/index.html");
+pref("browser.startup.homepage",           "http://dywang.csie.cyut.
     edu.tw");
```

```
 pref("toolkit.storage.synchronous",          0);
-pref("startup.homepage_override_url",        "http://www.redhat.com");
-pref("startup.homepage_welcome_url",         "http://www.redhat.com");
+pref("startup.homepage_override_url",        "http://dywang.csie.cyut.
    edu.tw");
+pref("startup.homepage_welcome_url",         "http://dywang.csie.cyut.
    edu.tw");
 pref("extensions.shownSelectionUI",          true);
 /* Workaround for rhbz#1110291 */
 pref("network.negotiate-auth.allow-insecure-ntlm-v1", true);
```

23. 修改 firefox hello 底色。

```
grep '#00a9dc' -R firefox-45.1.0esr/browser/extensions/loop/ -l | sort -
    u | xargs sed -i 's/#00a9dc/#7C9C90/g'
```

24. firefox hello 網頁分享提示 bar 高度由 40px 降低爲 20px。

```
[dywang@dywnb SOURCES]$ diff -uN ../tmp/firefox-45.1.0esr/browser/
    extensions/loop/chrome/skin/shared/loop.css \
firefox-45.1.0esr/browser/extensions/loop/chrome/skin/shared/loop.css
--- ../tmp/firefox-45.1.0esr/browser/extensions/loop/chrome/skin/shared/
    loop.css    2016-04-21 05:32:52.000000000 +0800
+++ firefox-45.1.0esr/browser/extensions/loop/chrome/skin/shared/loop.
    css   2016-07-04 11:31:26.358234729 +0800
@@ -171,8 +171,8 @@

   notification[value="loop-sharing-notification"] {
     -moz-appearance: none;
-    height: 40px;
-    background-color: #00a9dc;
+    height: 20px;
+    background-color: #7C9C90;
     box-shadow: 0 -1px 1px rgba(0,0,0,.4) inset;
   }

@@ -186,7 +186,7 @@
   }

   notification[value="loop-sharing-notification"].paused .notification-
       inner {
-    color: #00a9dc;
+    color: #7C9C90;
   }

   notification[value="loop-sharing-notification"] .notification-inner
       description {
@@ -199,7 +199,7 @@
     background-color: #fff;
```

```
27      border: 0;
        padding: .2rem 1rem .4rem;
29  -   height: 40px;
    +   height: 20px;
31      margin: 0;
        list-style-image: url(chrome://loop/content/shared/img/pause-12x12.
            svg);
33      box-shadow: 0 -1px 1px rgba(0,0,0,.5) inset;
    @@ -252,8 +252,8 @@
35    }

37    chatbox[src^="about:loopconversation#"] > .chat-titlebar {
    -   background-color: #00a9dc;
39  -   border-color: #00a9dc;
    +   background-color: #7C9C90;
41  +   border-color: #7C9C90;
      }
43
      chatbox[src^="about:loopconversation#"] .chat-title {
45  @@ -274,7 +274,7 @@
        border: 1px solid #d13f1a;
47      border-top-right-radius: 4px;
        width: 32px;
49  -   height: 26px;
    +   height: 20px;
51      margin-top: -6px;
        margin-bottom: -5px;
53      -moz-margin-start: 6px;
```

25. 重新打包壓縮 firefox-45.1.0esr 目錄。

```
1  [dywang@dywnb SOURCES]$ tar Jcvf firefox-45.1.0esr.source.tar.xz firefox
       -45.1.0esr
```

26. 再同時建立 RPM 及 SRPM 二進位檔字，firefox RPM 建立要 1 小時以上，要耐心等候。成功建立的訊息最後幾行，看到產生 firefox firefox-debuginfo 二個 RPM 檔及一個 firefox SRPM 檔。

```
1  [dywang@dywnb SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
       SPECS/firefox.spec
.....................
3  Conflicts: firefox < 38.0
   Obsoletes: mozilla <= 37:1.7.13 firefox < 38.0
5  Processing files: firefox-debuginfo-45.1.0-1.el6.dyw.x86_64
   Checking for unpackaged file(s): /usr/lib/rpm/check-files /home/dywang/
       rpmbuild/BUILDROOT/firefox-45.1.0-1.el6.dyw.x86_64
7  Wrote: /home/dywang/rpmbuild/SRPMS/firefox-45.1.0-1.el6.dyw.src.rpm
   Wrote: /home/dywang/rpmbuild/RPMS/x86_64/firefox-45.1.0-1.el6.dyw.x86_64
       .rpm
```

```
Wrote: /home/dywang/rpmbuild/RPMS/x86_64/firefox-debuginfo-45.1.0-1.el6.
    dyw.x86_64.rpm
Executing(%clean): /bin/sh -e /var/tmp/rpm-tmp.2TpIMH
+ umask 022
+ cd /home/dywang/rpmbuild/BUILD
+ cd firefox-45.1.0
+ /bin/rm -rf /home/dywang/rpmbuild/BUILDROOT/firefox-45.1.0-1.el6.dyw.
    x86_64
+ exit 0
Executing(--clean): /bin/sh -e /var/tmp/rpm-tmp.GaruLg
+ umask 022
+ cd /home/dywang/rpmbuild/BUILD
+ rm -rf firefox-45.1.0
+ exit 0
```

18.15 firefox-60 套件實例

1. 緣由：firefox v52 無法使用 hangout 視訊。

2. 下載 SRPM 套件

```
[dywang@dyw219 ~]$ cd rpmbuild
[dywang@dyw219 rpmbuild]$ wget ftp://ftp.pbone.net/mirror/ftp.redhat.com
    /pub\
/redhat/linux/enterprise/6ComputeNode/en/os/SRPMS/firefox-60.9.0-1.
    el6_10.src.rpm
```

3. 安裝 SRPM 套件

```
[dywang@dyw219 rpmbuild]$ rpm -ivh firefox-60.9.0-1.el6_10.src.rpm
```

4. 查看安裝的所有檔案。

```
[dywang@dyw219 rpmbuild]$ rpm -qpl firefox-60.9.0-1.el6_10.src.rpm
warning: firefox-60.9.0-1.el6_10.src.rpm: Header V3 RSA/SHA256 Signature
    , key ID fd431d51: NOKEY
Python-2.7.13.tar.xz
build-aarch64-skia.patch
build-big-endian.patch
build-debug-qcms.patch
build-disable-elfhack.patch
build-gdk-version.patch
build-icu-big-endian.patch
build-jit-atomic-always-lucky.patch
```

```
11 build-mozconfig-fix.patch
   build-nss-version.patch
13 distribution.ini
   firefox-60.9.0esr.source.tar.xz
15 firefox-enable-addons.patch
   firefox-langpacks-60.9.0esr-20190902.tar.xz
17 firefox-mozconfig
   firefox-pipewire.patch
19 firefox-redhat-default-prefs.js
   firefox-symbolic.svg
21 firefox.1
   firefox.desktop
23 firefox.sh.in
   firefox.spec
25 google-api-key
   gtk3-private-3.22.26-1-files.inc
27 gtk3-private-3.22.26-1-post.inc
   gtk3-private-3.22.26-1-posttrans.inc
29 gtk3-private-3.22.26-1-postun.inc
   gtk3-private-3.22.26-1-requires-provides-filter.inc
31 gtk3-private-3.22.26-1-setup-flags-env.inc
   gtk3-private-3.22.26-1.el6.src.rpm
33 libffi-3.0.13-18.el7_3.src.rpm
   mozilla-1005640-accept-lang.patch
35 mozilla-1170092.patch
   mozilla-1196777.patch
37 mozilla-1353817.patch
   mozilla-1436242.patch
39 mozilla-256180.patch
   mozilla-526293.patch
41 mozilla-api-key
   mozilla-build-arm.patch
43 rhbz-1173156.patch
   rhbz-1354671.patch
45 rhbz-1503632-nss.patch
   xulrunner-24.0-jemalloc-ppc.patch
47 yasm-1.2.0-3.el5.src.rpm
```

5. 查看程式主要的打包壓縮檔。

```
1 [dywang@dyw219 SOURCES]$ cd SOURCES/
  [dywang@dyw219 SOURCES]$ ls firefox-60.9.0esr.source.tar.xz
3 firefox-60.9.0esr.source.tar.xz
```

6. 解壓縮原始碼 tarball，產生 firefox-45.1.0esr 目錄，存放原始碼。

```
1 [dywang@dyw219 SOURCES]$ tar xJvf firefox-60.9.0esr.source.tar.xz
```

7. 查看解壓縮目錄 firefox-60.9.0 內的檔案。

```
[dywang@dyw219 SOURCES]$ ls firefox-60.9.0
accessible    dom                memory               services
aclocal.m4    editor             mfbt                 servo
AUTHORS       embedding          mobile               settings.gradle
browser       extensions         modules              sourcestamp.txt
build         gfx                moz.build            startupcache
build.gradle  GNUmakefile        moz.configure        storage
caps          gradle             mozglue              taskcluster
Cargo.lock    gradle.properties  mozilla-config.h.in  testing
Cargo.toml    gradlew            netwerk              test.mozbuild
chrome        hal                npm-shrinkwrap.json  third_party
client.mk     image              nsprpub              toolkit
client.py     intl               old-configure        tools
CLOBBER       ipc                old-configure.in     uriloader
config        js                 other-licenses       view
configure     layout             package.json         widget
configure.in  LEGAL              parser               xpcom
configure.py  LICENSE            python               xpfe
db            mach               rdf
devtools      Makefile.in        README.txt
docshell      media              security
```

8. 進入暫存目錄 tmp，解開原始 src.rpm，方便做修改的比對。

```
[dywang@dyw219 tmp]$ rm ./* -rf
[dywang@dyw219 tmp]$ rpm2cpio ../firefox-60.9.0-1.el6_10.src.rpm | cpio
    -idvm
Python-2.7.13.tar.xz
build-aarch64-skia.patch
build-big-endian.patch
build-debug-qcms.patch
build-disable-elfhack.patch
build-gdk-version.patch
build-icu-big-endian.patch
build-jit-atomic-always-lucky.patch
build-mozconfig-fix.patch
build-nss-version.patch
distribution.ini
firefox-60.9.0esr.source.tar.xz
firefox-enable-addons.patch
firefox-langpacks-60.9.0esr-20190902.tar.xz
firefox-mozconfig
firefox-pipewire.patch
firefox-redhat-default-prefs.js
firefox-symbolic.svg
firefox.1
firefox.desktop
firefox.sh.in
firefox.spec
google-api-key
```

```
gtk3-private-3.22.26-1-files.inc
gtk3-private-3.22.26-1-post.inc
gtk3-private-3.22.26-1-posttrans.inc
gtk3-private-3.22.26-1-postun.inc
gtk3-private-3.22.26-1-requires-provides-filter.inc
gtk3-private-3.22.26-1-setup-flags-env.inc
gtk3-private-3.22.26-1.el6.src.rpm
libffi-3.0.13-18.el7_3.src.rpm
mozilla-1005640-accept-lang.patch
mozilla-1170092.patch
mozilla-1196777.patch
mozilla-1353817.patch
mozilla-1436242.patch
mozilla-256180.patch
mozilla-526293.patch
mozilla-api-key
mozilla-build-arm.patch
rhbz-1173156.patch
rhbz-1354671.patch
rhbz-1503632-nss.patch
xulrunner-24.0-jemalloc-ppc.patch
yasm-1.2.0-3.el5.src.rpm
854680 blocks
```

9. 暫存目錄下解開 firefox-60.9.0esr.source.tar.xz

```
[dywang@dyw219 tmp]$ tar Jxvf firefox-60.9.0esr.source.tar.xz
```

10. 修改 RPM spec 規格檔，版本加入 dyw。

```
[dywang@dyw219 tmp]$ cd ../SOURCES/
[dywang@dyw219 SOURCES]$ vim ../SPECS/firefox.spec
[dywang@dyw219 SOURCES]$ diff -uN ../tmp/firefox.spec ../SPECS/firefox.
   spec
--- ../tmp/firefox.spec 2019-09-02 19:17:11.000000000 +0800
+++ ../SPECS/firefox.spec   2019-10-22 06:48:42.790943109 +0800
@@ -142,7 +142,7 @@
 Summary:        Mozilla Firefox Web browser
 Name:           firefox
 Version:        60.9.0
-Release:        1%{?pre_tag}%{?dist}
+Release:        1%{?pre_tag}%{?dist}.dyw
 URL:            https://www.mozilla.org/firefox/
 License:        MPLv1.1 or GPLv2+ or LGPLv2+
 %if 0%{?rhel} == 7
```

11. 修改其他編碼爲 UTF-8。

```
[dywang@dyw219 SOURCES]$ vim firefox-60.9.0/browser/components/
    preferences/fonts.xul
[dywang@dyw219 SOURCES]$ diff -uN ../tmp/firefox-60.9.0/browser/
    components/\
preferences/fonts.xul firefox-60.9.0/browser/components/preferences/
    fonts.xul
--- ../tmp/firefox-60.9.0/browser/components/preferences/fonts.xul
    2019-09-01 21:09:05.000000000 +0800
+++ firefox-60.9.0/browser/components/preferences/fonts.xul
    2019-10-22 06:53:30.883965034 +0800
@@ -293,7 +293,7 @@
      <menuitem label="&languages.customize.Fallback.thai;"       value=
          "windows-874"/>
      <menuitem label="&languages.customize.Fallback.turkish;"    value=
          "windows-1254"/>
      <menuitem label="&languages.customize.Fallback.vietnamese;" value=
          "windows-1258"/>
      <menuitem label="&languages.customize.Fallback.other;"      value=
          "windows-1252"/>
      <menuitem label="&languages.customize.Fallback.other;"      value=
          "utf-8"/>
    </menupopup>
  </menulist>
</hbox>
```

12. 增加瀏覽器語系 en-US。

```
[dywang@dyw219 SOURCES]$ vim firefox-60.9.0/browser/locales/all-locales
[dywang@dyw219 SOURCES]$ diff -uN ../tmp/firefox-60.9.0/browser/locales
    /\
all-locales firefox-60.9.0/browser/locales/all-locales
--- ../tmp/firefox-60.9.0/browser/locales/all-locales   2019-09-01
    21:09:05.000000000 +0800
+++ firefox-60.9.0/browser/locales/all-locales  2019-10-22
    06:56:29.193978604 +0800
@@ -19,6 +19,7 @@
 de
 dsb
 el
+en-US
 en-GB
 en-ZA
 eo
```

13. 當找不到編碼時預設使用 UTF-8。

```
[dywang@dyw219 SOURCES]$ vim firefox-60.9.0/dom/encoding/
    FallbackEncoding.cpp
```

14. unix 系統預設使用 UTF-8 編碼。

```
[dywang@dyw219 SOURCES]$ vim firefox-60.9.0/intl/locale/gtk/
    OSPreferences_gtk.cpp
```

15. 預設等寬字 monospace 字型大小爲 16。

```
[dywang@dyw219 SOURCES]$ sed -i 's/\(font.size.fixed.[a-z\-]*", \)
    1[0-9]/\116/g'
 firefox-60.9.0/modules/libpref/init/all.js | grep font.size.fixed
[dywang@dyw219 SOURCES]$ diff -uN ../tmp/firefox-60.9.0/modules/libpref/
    init/\
all.js firefox-60.9.0/modules/libpref/init/all.js
--- ../tmp/firefox-60.9.0/modules/libpref/init/all.js   2019-09-01
    21:09:28.000000000 +0800
+++ firefox-60.9.0/modules/libpref/init/all.js  2019-10-22
    07:34:37.407152744 +0800
@@ -2385,7 +2385,7 @@
 // fallback charset list for Unicode conversion (converting from
     Unicode)
 // currently used for mail send only to handle symbol characters (e.g
     Euro, trademark, smartquotes)
 // for ISO-8859-1
-pref("intl.fallbackCharsetList.ISO-8859-1", "windows-1252");
+pref("intl.fallbackCharsetList.ISO-8859-1", "utf-8");
 pref("font.language.group",                 "chrome://global/locale/
     intl.properties");

 // Android-specific pref to use key-events-only mode for IME-unaware
     webapps.
@@ -3454,17 +3454,17 @@
 pref("font.default.ar", "sans-serif");
 pref("font.minimum-size.ar", 0);
 pref("font.size.variable.ar", 16);
-pref("font.size.fixed.ar", 13);
+pref("font.size.fixed.ar", 16);

 pref("font.default.el", "serif");
 pref("font.minimum-size.el", 0);
 pref("font.size.variable.el", 16);
-pref("font.size.fixed.el", 13);
+pref("font.size.fixed.el", 16);

 pref("font.default.he", "sans-serif");
 pref("font.minimum-size.he", 0);
 pref("font.size.variable.he", 16);
-pref("font.size.fixed.he", 13);
```

```
33 +pref("font.size.fixed.he", 16);
35  pref("font.default.ja", "sans-serif");
    pref("font.minimum-size.ja", 0);
37 @@ -3479,102 +3479,102 @@
    pref("font.default.th", "sans-serif");
39  pref("font.minimum-size.th", 0);
    pref("font.size.variable.th", 16);
41 -pref("font.size.fixed.th", 13);
   +pref("font.size.fixed.th", 16);
43
    pref("font.default.x-cyrillic", "serif");
45  pref("font.minimum-size.x-cyrillic", 0);
    pref("font.size.variable.x-cyrillic", 16);
47 -pref("font.size.fixed.x-cyrillic", 13);
   +pref("font.size.fixed.x-cyrillic", 16);
49
    pref("font.default.x-devanagari", "serif");
51  pref("font.minimum-size.x-devanagari", 0);
    pref("font.size.variable.x-devanagari", 16);
53 -pref("font.size.fixed.x-devanagari", 13);
   +pref("font.size.fixed.x-devanagari", 16);
55
    pref("font.default.x-tamil", "serif");
57  pref("font.minimum-size.x-tamil", 0);
    pref("font.size.variable.x-tamil", 16);
59 -pref("font.size.fixed.x-tamil", 13);
   +pref("font.size.fixed.x-tamil", 16);
61
    pref("font.default.x-armn", "serif");
63  pref("font.minimum-size.x-armn", 0);
    pref("font.size.variable.x-armn", 16);
65 -pref("font.size.fixed.x-armn", 13);
   +pref("font.size.fixed.x-armn", 16);
67
    pref("font.default.x-beng", "serif");
69  pref("font.minimum-size.x-beng", 0);
    pref("font.size.variable.x-beng", 16);
71 -pref("font.size.fixed.x-beng", 13);
   +pref("font.size.fixed.x-beng", 16);
73
    pref("font.default.x-cans", "serif");
75  pref("font.minimum-size.x-cans", 0);
    pref("font.size.variable.x-cans", 16);
77 -pref("font.size.fixed.x-cans", 13);
   +pref("font.size.fixed.x-cans", 16);
79
    pref("font.default.x-ethi", "serif");
81  pref("font.minimum-size.x-ethi", 0);
    pref("font.size.variable.x-ethi", 16);
83 -pref("font.size.fixed.x-ethi", 13);
   +pref("font.size.fixed.x-ethi", 16);
85
    pref("font.default.x-geor", "serif");
```

```
 pref("font.minimum-size.x-geor", 0);
 pref("font.size.variable.x-geor", 16);
-pref("font.size.fixed.x-geor", 13);
+pref("font.size.fixed.x-geor", 16);

 pref("font.default.x-gujr", "serif");
 pref("font.minimum-size.x-gujr", 0);
 pref("font.size.variable.x-gujr", 16);
-pref("font.size.fixed.x-gujr", 13);
+pref("font.size.fixed.x-gujr", 16);

 pref("font.default.x-guru", "serif");
 pref("font.minimum-size.x-guru", 0);
 pref("font.size.variable.x-guru", 16);
-pref("font.size.fixed.x-guru", 13);
+pref("font.size.fixed.x-guru", 16);

 pref("font.default.x-khmr", "serif");
 pref("font.minimum-size.x-khmr", 0);
 pref("font.size.variable.x-khmr", 16);
-pref("font.size.fixed.x-khmr", 13);
+pref("font.size.fixed.x-khmr", 16);

 pref("font.default.x-mlym", "serif");
 pref("font.minimum-size.x-mlym", 0);
 pref("font.size.variable.x-mlym", 16);
-pref("font.size.fixed.x-mlym", 13);
+pref("font.size.fixed.x-mlym", 16);

 pref("font.default.x-orya", "serif");
 pref("font.minimum-size.x-orya", 0);
 pref("font.size.variable.x-orya", 16);
-pref("font.size.fixed.x-orya", 13);
+pref("font.size.fixed.x-orya", 16);

 pref("font.default.x-telu", "serif");
 pref("font.minimum-size.x-telu", 0);
 pref("font.size.variable.x-telu", 16);
-pref("font.size.fixed.x-telu", 13);
+pref("font.size.fixed.x-telu", 16);

 pref("font.default.x-knda", "serif");
 pref("font.minimum-size.x-knda", 0);
 pref("font.size.variable.x-knda", 16);
-pref("font.size.fixed.x-knda", 13);
+pref("font.size.fixed.x-knda", 16);

 pref("font.default.x-sinh", "serif");
 pref("font.minimum-size.x-sinh", 0);
 pref("font.size.variable.x-sinh", 16);
-pref("font.size.fixed.x-sinh", 13);
+pref("font.size.fixed.x-sinh", 16);

 pref("font.default.x-tibt", "serif");
```

```
 pref("font.minimum-size.x-tibt", 0);
 pref("font.size.variable.x-tibt", 16);
-pref("font.size.fixed.x-tibt", 13);
+pref("font.size.fixed.x-tibt", 16);

 pref("font.default.x-unicode", "serif");
 pref("font.minimum-size.x-unicode", 0);
 pref("font.size.variable.x-unicode", 16);
-pref("font.size.fixed.x-unicode", 13);
+pref("font.size.fixed.x-unicode", 16);

 pref("font.default.x-western", "serif");
 pref("font.minimum-size.x-western", 0);
 pref("font.size.variable.x-western", 16);
-pref("font.size.fixed.x-western", 13);
+pref("font.size.fixed.x-western", 16);

 pref("font.default.zh-CN", "sans-serif");
 pref("font.minimum-size.zh-CN", 0);
@@ -3596,7 +3596,7 @@
 pref("font.default.x-math", "serif");
 pref("font.minimum-size.x-math", 0);
 pref("font.size.variable.x-math", 16);
-pref("font.size.fixed.x-math", 13);
+pref("font.size.fixed.x-math", 16);

 /*
  * A value greater than zero enables font size inflation for
@@ -4414,17 +4414,17 @@
 pref("font.name-list.serif.ar", "serif");
 pref("font.name-list.sans-serif.ar", "sans-serif");
 pref("font.name-list.monospace.ar", "monospace");
-pref("font.size.fixed.ar", 12);
+pref("font.size.fixed.ar", 16);

 pref("font.name-list.serif.el", "serif");
 pref("font.name-list.sans-serif.el", "sans-serif");
 pref("font.name-list.monospace.el", "monospace");
-pref("font.size.fixed.el", 12);
+pref("font.size.fixed.el", 16);

 pref("font.name-list.serif.he", "serif");
 pref("font.name-list.sans-serif.he", "sans-serif");
 pref("font.name-list.monospace.he", "monospace");
-pref("font.size.fixed.he", 12);
+pref("font.size.fixed.he", 16);

 pref("font.name-list.serif.ja", "serif");
 pref("font.name-list.sans-serif.ja", "sans-serif");
@@ -4454,7 +4454,7 @@
 pref("font.name-list.serif.x-cyrillic", "serif");
 pref("font.name-list.sans-serif.x-cyrillic", "sans-serif");
 pref("font.name-list.monospace.x-cyrillic", "monospace");
-pref("font.size.fixed.x-cyrillic", 12);
```

```
+pref("font.size.fixed.x-cyrillic", 16);

 pref("font.name-list.serif.x-devanagari", "serif");
 pref("font.name-list.sans-serif.x-devanagari", "sans-serif");
@@ -4511,12 +4511,12 @@
 pref("font.name-list.serif.x-unicode", "serif");
 pref("font.name-list.sans-serif.x-unicode", "sans-serif");
 pref("font.name-list.monospace.x-unicode", "monospace");
-pref("font.size.fixed.x-unicode", 12);
+pref("font.size.fixed.x-unicode", 16);

 pref("font.name-list.serif.x-western", "serif");
 pref("font.name-list.sans-serif.x-western", "sans-serif");
 pref("font.name-list.monospace.x-western", "monospace");
-pref("font.size.fixed.x-western", 12);
+pref("font.size.fixed.x-western", 16);

 pref("font.name-list.serif.zh-CN", "serif");
 pref("font.name-list.sans-serif.zh-CN", "sans-serif");
@@ -4560,21 +4560,21 @@
 #if defined(ANDROID)

-pref("font.size.fixed.ar", 12);
+pref("font.size.fixed.ar", 16);

 pref("font.default.el", "sans-serif");
-pref("font.size.fixed.el", 12);
+pref("font.size.fixed.el", 16);

-pref("font.size.fixed.he", 12);
+pref("font.size.fixed.he", 16);

 pref("font.default.x-cyrillic", "sans-serif");
-pref("font.size.fixed.x-cyrillic", 12);
+pref("font.size.fixed.x-cyrillic", 16);

 pref("font.default.x-unicode", "sans-serif");
-pref("font.size.fixed.x-unicode", 12);
+pref("font.size.fixed.x-unicode", 16);

 pref("font.default.x-western", "sans-serif");
-pref("font.size.fixed.x-western", 12);
+pref("font.size.fixed.x-western", 16);

 # ANDROID
 #endif
```

16. toolkit 語系增加 en-US。

```
[dywang@dyw219 SOURCES]$ vim firefox-60.9.0/toolkit/locales/all-locales
```

```
[dywang@dyw219 SOURCES]$ diff -uN ../tmp/firefox-60.9.0/toolkit/locales
    /\
all-locales firefox-60.9.0/toolkit/locales/all-locales
--- ../tmp/firefox-60.9.0/toolkit/locales/all-locales
    2019-09-01 21:10:20.000000000 +0800
+++ firefox-60.9.0/toolkit/locales/all-locales
    2019-10-22 07:38:57.752172557 +0800
@@ -12,3 +12,4 @@
 ro
 sv-SE
 ru
+en-US
```

17. 增加 zh-TW 可用語系。

```
[dywang@dyw219 SOURCES]$ vim firefox-60.9.0/toolkit/locales/en-US/chrome
    /\
global/intl.properties
[dywang@dyw219 SOURCES]$ diff -uN ../tmp/firefox-60.9.0/toolkit/locales
    /\
en-US/chrome/global/intl.properties \
firefox-60.9.0/toolkit/locales/en-US/chrome/global/intl.properties
--- ../tmp/firefox-60.9.0/toolkit/locales/en-US/chrome/global/intl.
    properties
    2019-09-01 21:10:19.000000000 +0800
+++ firefox-60.9.0/toolkit/locales/en-US/chrome/global/intl.properties
    2019-10-22 07:40:44.895180711 +0800
@@ -20,7 +20,7 @@
 # British English in their list, since those languages are commonly
     spoken in
 # the same area as Breton:
 # intl.accept_languages=br, fr-FR, fr, en-GB, en
-intl.accept_languages=en-US, en
+intl.accept_languages=en-US, en, zh-TW

 # LOCALIZATION NOTE (font.language.group):
 # This preference controls the initial setting of the language drop-
     down menu
```

18. 系統預設使用 UTF-8 編碼。

```
[dywang@dyw219 SOURCES]$ vim firefox-60.9.0/toolkit/locales/en-US/chrome
    /\
global-platform/unix/intl.properties
[dywang@dyw219 SOURCES]$ diff -uN ../tmp/firefox-60.9.0/toolkit/locales
    /\
en-US/chrome/global-platform/unix/intl.properties firefox-60.9.0/toolkit
    /\
locales/en-US/chrome/global-platform/unix/intl.properties
```

```
--- ../tmp/firefox-60.9.0/toolkit/locales/en-US/chrome/global-platform/
unix/intl.properties    2019-09-01 21:09:57.000000000 +0800
+++ firefox-60.9.0/toolkit/locales/en-US/chrome/global-platform/unix/
intl.properties 2019-10-22 07:43:37.751193866 +0800
@@ -4,4 +4,4 @@

 # LOCALIZATION NOTE (intl.ellipsis): Use the unicode ellipsis char, \
    u2026,
 # or use "..." if \u2026 doesn't suit traditions in your locale.
-intl.ellipsis=…
+intl.ellipsis=utf-8
```

19. 最小字型大小由 None 改爲 12。

```
[dywang@dyw219 SOURCES]$ diff -uN ../tmp/firefox-60.9.0/browser/locales/
   en-US/\
chrome/browser/preferences/fonts.dtd firefox-60.9.0/browser/locales/en-
   US/\
chrome/browser/preferences/fonts.dtd
--- ../tmp/firefox-60.9.0/browser/locales/en-US/chrome/browser/
   preferences/fonts.dtd
    2019-09-01 21:09:05.000000000 +0800
+++ firefox-60.9.0/browser/locales/en-US/chrome/browser/preferences/
   fonts.dtd
    2019-10-26 10:40:22.998302206 +0800
@@ -55,7 +55,7 @@
 <!-- Minimum font size -->
 <!ENTITY minSize2.label                          "Minimum font size">
 <!ENTITY minSize2.accesskey                      "o">
-<!ENTITY minSize.none                            "None">
+<!ENTITY minSize.none                            "12">

 <!-- default font type -->
 <!ENTITY  useDefaultFontSerif.label              "Serif">
```

20. uidensity 預設由 Normal(0) 改成 Compact(1)。

```
[dywang@dyw219 SOURCES]$ diff -uN ../tmp/firefox-60.9.0/browser/app/
   profile/\
firefox.js firefox-60.9.0/browser/app/profile/firefox.js
--- ../tmp/firefox-60.9.0/browser/app/profile/firefox.js
    2019-09-01 21:09:05.000000000 +0800
+++ firefox-60.9.0/browser/app/profile/firefox.js
    2019-10-26 11:14:05.163456099 +0800
@@ -239,7 +239,7 @@

 // UI density of the browser chrome. This mostly affects toolbarbutton
 // and urlbar spacing. The possible values are 0=normal, 1=compact, 2=
    touch.
```

```
-pref("browser.uidensity", 0);
+pref("browser.uidensity", 1);
 // Whether Firefox will automatically override the uidensity to "touch"
 // while the user is in a touch environment (such as Windows tablet
     mode).
 pref("browser.touchmode.auto", true);
```

21. 修改預設首頁到個人網頁。

```
[dywang@dyw219 SOURCES]$ vim firefox-redhat-default-prefs.js
[dywang@dyw219 SOURCES]$ sed -i 's|\(startup.homepage.*\",\ *\"\).*\"|\
\1http://dywang.csie.cyut.edu.tw\"|g' firefox-redhat-default-prefs.js
[dywang@dyw219 SOURCES]$ diff -uN ../tmp/firefox-redhat-default-prefs.js
    \
 firefox-redhat-default-prefs.js
--- ../tmp/firefox-redhat-default-prefs.js  2019-09-02
    19:17:03.000000000 +0800
+++ firefox-redhat-default-prefs.js 2019-10-22 07:47:17.020210553 +0800
@@ -14,9 +14,9 @@
 pref("network.manage-offline-status",       true);
 pref("extensions.shownSelectionUI",         true);
 pref("ui.SpellCheckerUnderlineStyle",       1);
-pref("startup.homepage_override_url",       "http://www.redhat.com");
-pref("startup.homepage_welcome_url",        "http://www.redhat.com");
-pref("browser.startup.homepage",            "data:text/plain,browser.
    startup.homepage=file:///usr/share/doc/HTML/index.html");
+pref("startup.homepage_override_url",       "http://dywang.csie.cyut.
    edu.tw");
+pref("startup.homepage_welcome_url",        "http://dywang.csie.cyut.
    edu.tw");
+pref("browser.startup.homepage",            "http://dywang.csie.cyut.
    edu.tw");
 pref("geo.wifi.uri", "https://location.services.mozilla.com/v1/
     geolocate?key=%MOZILLA_API_KEY%");
 pref("media.gmp-gmpopenh264.provider.enabled",false);
 pref("media.gmp-gmpopenh264.autoupdate",false);
```

22. 重新打包壓縮 firefox-60.9.0 目錄。

```
[dywang@dyw219 SOURCES]$ tar Jcvf firefox-60.9.0esr.source.tar.xz
    firefox-60.9.0
```

23. 解決 firefox-60 無法使用中文輸入的問題

```
[dywang@dyw219 SOURCES]$ vim firefox.sh.in
[dywang@dyw219 SOURCES]$ diff -uN ../tmp/firefox.sh.in firefox.sh.in
```

```
--- ../tmp/firefox.sh.in    2019-09-02 19:17:03.000000000 +0800
+++ firefox.sh.in   2019-10-25 19:11:33.389061007 +0800
@@ -48,6 +48,7 @@
        ;;
 esac

+export GTK_IM_MODULE=xim
 MOZ_FIREFOX_FILE="firefox"

 if [ ! -r $MOZ_LIB_DIR/firefox/$MOZ_FIREFOX_FILE ]; then
```

24. 需要以下套件

```
[dywang@dyw219 SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
   SPECS/firefox.spec
Building target platforms: x86_64
Building for target x86_64
error: Failed build dependencies:
    devtoolset-7-gcc-c++ is needed by firefox-60.9.0-1.el6.dyw.x86_64
    devtoolset-7-gcc is needed by firefox-60.9.0-1.el6.dyw.x86_64
    devtoolset-7-binutils is needed by firefox-60.9.0-1.el6.dyw.x86_64
    devtoolset-7-libatomic-devel is needed by firefox-60.9.0-1.el6.dyw.
       x86_64
    rust-toolset-7-cargo is needed by firefox-60.9.0-1.el6.dyw.x86_64
    rust-toolset-7-rust >= 1.24 is needed by firefox-60.9.0-1.el6.dyw.
       x86_64
```

25. 需要以下套件

```
```

26. 再同時建立 RPM 及 SRPM 二進位檔字，firefox RPM 建立要 1 小時以上，要耐心等候。成功建立的訊息最後幾行，看到產生 firefox firefox-debuginfo 二個 RPM 檔及一個 firefox SRPM 檔。

```
[dywang@dyw219 SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
   SPECS/firefox.spec
編譯尚未成功
```

18.16 firefox-52 套件實例

1. 緣由：firefox v45 某些網頁無法瀏覽。

2. 下載 SRPM 套件

```
[dywang@dyw219 ~]$ cd rpmbuild
[dywang@dyw219 rpmbuild]$ wget http://vault.centos.org/centos/6.9/
    updates/\
Source/SPackages/firefox-52.6.0-1.el6.centos.src.rpm
```

3. 安裝 SRPM 套件

```
[dywang@dyw219 rpmbuild]$ rpm -ivh firefox-52.6.0-1.el6.centos.src.rpm
warning: firefox-52.6.0-1.el6.centos.src.rpm: Header V3 RSA/SHA1
    Signature, key ID c105b9de: NOKEY
   1:firefox               ##########################################
      [100%]
```

4. 查看安裝的所有檔案。

```
[dywang@dyw219 SOURCES]$ rpm -qpl ../firefox-52.6.0-1.el6.centos.src.rpm
warning: ../firefox-52.6.0-1.el6.centos.src.rpm: Header V3 RSA/SHA1
    Signature, key ID c105b9de: NOKEY
Python-2.7.8.tgz
build-icu-big-endian.patch
build-missing-getrandom.patch
build-nss-prbool.patch
build-nss-version.patch
build-s390-atomic.patch
build-s390-missing-include.patch
devtoolset-2-binutils-2.23.52.0.1-10.el5.src.rpm
ff52-pseudoelement-crash.patch
find-external-requires
firefox-52.6.0esr.source.tar.xz
firefox-centos-default-prefs.js
firefox-default.patch
firefox-enable-addons.patch
firefox-enable-plugins.patch
firefox-install-dir.patch
firefox-langpacks-52.6.0esr-20180118.tar.xz
firefox-mozconfig
firefox-ppc64le.patch
firefox.1
firefox.desktop
firefox.sh.in.rhel6
firefox.sh.in.rhel7
firefox.spec
gcc48-4.8.2-16.el5.src.rpm
libffi-3.0.13-18.el7_3.src.rpm
mozilla-1152515.patch
mozilla-1170092-etc-conf.patch
mozilla-256180.patch
```

```
mozilla-api-key
rhbz-1173156.patch
rhbz-1414535.patch
rhbz-1423012.patch
rhbz-966424.patch
webrtc-arch-cpu.patch
xulrunner-24.0-jemalloc-ppc.patch
yasm-1.2.0-3.el5.src.rpm
```

5. 查看程式主要的打包壓縮檔。

```
[dywang@dyw219 SOURCES]$ ls firefox-52.6.0esr.source.tar.xz
firefox-52.6.0esr.source.tar.xz
```

6. 解壓縮原始碼 tarball，產生 firefox-45.1.0esr 目錄，存放原始碼。

```
[dywang@dyw219 SOURCES]$ tar xJvf firefox-52.6.0esr.source.tar.xz
```

7. 查看 firefox-45.1.0esr 目錄內的檔案。

```
[dywang@dyw219 SOURCES]$ ls firefox-52.6.0esr
accessible     devtools           mach                rdf
aclocal.m4     docshell           Makefile.in         README.txt
addon-sdk      dom                media               security
Android.mk     editor             memory              services
AUTHORS        embedding          mfbt                settings.gradle
b2g            extensions         mobile              sourcestamp.txt
browser        gfx                modules             startupcache
build          GNUmakefile        moz.build           storage
build.gradle   gradle             moz.configure       taskcluster
caps           gradle.properties  mozglue             testing
chrome         gradlew            mozilla-config.h.in test.mozbuild
client.mk      hal                netwerk             third_party
client.py      image              nsprpub             toolkit
CLOBBER        intl               old-configure       tools
config         ipc                old-configure.in    uriloader
configure      js                 other-licenses      view
configure.in   layout             parser              widget
configure.py   LEGAL              probes              xpcom
db             LICENSE            python              xpfe
```

8. 進入暫存目錄 tmp，解開原始 src.rpm，方便做修改的比對。

```
[dywang@dyw219 SOURCES]$ cd ../tmp/
[dywang@dyw219 tmp]$ rm ./* -rf
[dywang@dyw219 tmp]$ rpm2cpio ../firefox-52.6.0-1.el6.centos.src.rpm |
    cpio -idvm
Python-2.7.8.tgz
build-icu-big-endian.patch
build-missing-getrandom.patch
build-nss-prbool.patch
build-nss-version.patch
build-s390-atomic.patch
build-s390-missing-include.patch
devtoolset-2-binutils-2.23.52.0.1-10.el5.src.rpm
ff52-pseudoelement-crash.patch
find-external-requires
firefox-52.6.0esr.source.tar.xz
firefox-centos-default-prefs.js
firefox-default.patch
firefox-enable-addons.patch
firefox-enable-plugins.patch
firefox-install-dir.patch
firefox-langpacks-52.6.0esr-20180118.tar.xz
firefox-mozconfig
firefox-ppc64le.patch
firefox.1
firefox.desktop
firefox.sh.in.rhel6
firefox.sh.in.rhel7
firefox.spec
gcc48-4.8.2-16.el5.src.rpm
libffi-3.0.13-18.el7_3.src.rpm
mozilla-1152515.patch
mozilla-1170092-etc-conf.patch
mozilla-256180.patch
mozilla-api-key
rhbz-1173156.patch
rhbz-1414535.patch
rhbz-1423012.patch
rhbz-966424.patch
webrtc-arch-cpu.patch
xulrunner-24.0-jemalloc-ppc.patch
yasm-1.2.0-3.el5.src.rpm
758087 blocks
```

9. 暫存目錄下解開 firefox-52.6.0esr.source.tar.xz。

```
[dywang@dyw219 tmp]$ tar Jxvf firefox-52.6.0esr.source.tar.xz
```

10. 修改 RPM spec 規格檔，版本加入 dyw。

```
[dywang@dyw219 tmp]$ cd ../SOURCES/
[dywang@dyw219 SOURCES]$ vim ../SPECS/firefox.spec
[dywang@dyw219 SOURCES]$ diff -uN ../tmp/firefox.spec ../SPECS/firefox.
    spec
--- ../tmp/firefox.spec 2018-01-25 02:54:16.000000000 +0800
+++ ../SPECS/firefox.spec   2018-03-27 11:47:07.768197470 +0800
@@ -81,7 +81,7 @@
 Summary:        Mozilla Firefox Web browser
 Name:           firefox
 Version:        52.6.0
-Release:        1%{?dist}
+Release:        1%{?dist}.dyw
 URL:            http://www.mozilla.org/projects/firefox/
 License:        MPLv1.1 or GPLv2+ or LGPLv2+
 Group:          Applications/Internet
```

11. 修改其他編碼爲 UTF-8。

```
[dywang@dyw219 SOURCES]$ vim firefox-52.6.0esr/browser/components/
    preferences/fonts.xul
[dywang@dyw219 SOURCES]$ diff -uN ../tmp/firefox-52.6.0esr/browser/
    components/preferences/fonts.xul \
firefox-52.6.0esr/browser/components/preferences/fonts.xul
--- ../tmp/firefox-52.6.0esr/browser/components/preferences/fonts.xul
    2017-04-11 10:13:07.000000000 +0800
+++ firefox-52.6.0esr/browser/components/preferences/fonts.xul
    2018-03-27 11:49:57.713210403 +0800
@@ -270,7 +270,7 @@
             <menuitem label="&languages.customize.Fallback.thai;"
                       value="windows-874"/>
             <menuitem label="&languages.customize.Fallback.turkish;"
                       value="windows-1254"/>
             <menuitem label="&languages.customize.Fallback.vietnamese;"
                       value="windows-1258"/>
-            <menuitem label="&languages.customize.Fallback.other;"
          value="windows-1252"/>
+            <menuitem label="&languages.customize.Fallback.other;"
          value="UTF-8"/>
           </menupopup>
         </menulist>
       </hbox>
```

12. 增加瀏覽器語系 en-US。

```
[dywang@dyw219 SOURCES]$ vim firefox-52.6.0esr/browser/locales/all-
    locales
[dywang@dyw219 SOURCES]$ diff -uN ../tmp/firefox-52.6.0esr/browser/
    locales/all-locales \
```

```
firefox-52.6.0esr/browser/locales/all-locales
--- ../tmp/firefox-52.6.0esr/browser/locales/all-locales    2017-04-11
    10:13:08.000000000 +0800
+++ firefox-52.6.0esr/browser/locales/all-locales   2018-03-27
    11:51:49.609218919 +0800
@@ -18,6 +18,7 @@
 de
 dsb
 el
+en-US
 en-GB
 en-ZA
 eo
```

13. 當找不到編碼時預設使用 UTF-8。

```
[dywang@dyw219 SOURCES]$ vim firefox-52.6.0esr/dom/encoding/
    FallbackEncoding.cpp
[dywang@dyw219 SOURCES]$ diff -uN ../tmp/firefox-52.6.0esr/dom/encoding/
    FallbackEncoding.cpp \
firefox-52.6.0esr/dom/encoding/FallbackEncoding.cpp
--- ../tmp/firefox-52.6.0esr/dom/encoding/FallbackEncoding.cpp
    2017-04-11 10:13:18.000000000 +0800
+++ firefox-52.6.0esr/dom/encoding/FallbackEncoding.cpp 2018-03-27
    11:54:15.313230007 +0800
@@ -97,7 +97,7 @@

   if (NS_FAILED(nsUConvPropertySearch::SearchPropertyValue(
       localesFallbacks, ArrayLength(localesFallbacks), locale,
           mFallback))) {
-    mFallback.AssignLiteral("windows-1252");
+    mFallback.AssignLiteral("UTF-8");
   }

   aFallback = mFallback;
@@ -162,7 +162,7 @@
 {
   if (NS_FAILED(nsUConvPropertySearch::SearchPropertyValue(
       domainsFallbacks, ArrayLength(domainsFallbacks), aTLD, aFallback)
           )) {
-    aFallback.AssignLiteral("windows-1252");
+    aFallback.AssignLiteral("UTF-8");
   }
 }
```

14. unix 系統預設使用 UTF-8 編碼。

```
[dywang@dyw219 SOURCES]$ vim firefox-52.6.0esr/intl/locale/unix/
    nsDateTimeFormatUnix.cpp
```

```
[dywang@dyw219 SOURCES]$ diff -uN ../tmp/firefox-52.6.0esr/intl/locale/
    unix/nsDateTimeFormatUnix.cpp \
firefox-52.6.0esr/intl/locale/unix/nsDateTimeFormatUnix.cpp
--- ../tmp/firefox-52.6.0esr/intl/locale/unix/nsDateTimeFormatUnix.cpp
    2017-04-11 10:13:11.000000000 +0800
+++ firefox-52.6.0esr/intl/locale/unix/nsDateTimeFormatUnix.cpp
    2018-03-27 12:01:27.770262919 +0800
@@ -45,7 +45,7 @@
     }
   }

-  mCharset.AssignLiteral("windows-1252");
+  mCharset.AssignLiteral("UTF-8");
   mPlatformLocale.AssignLiteral("en_US");
```

15. 預設等寬字 monospace，實際使用時不會等寬，故修改成 DejaVu Sans Mono，並修改預設字型大小等寬字爲 14。

```
[dywang@dyw219 SOURCES]$ vim firefox-52.6.0esr/modules/libpref/init/all.
    js
[dywang@dyw219 SOURCES]$ sed -i 's/\(font.size.fixed.*\)1[0-9]/\114/g' \
firefox-52.6.0esr/modules/libpref/init/all.js
[dywang@dyw219 SOURCES]$ diff -uN ../tmp/firefox-52.6.0esr/modules/
    libpref/init/all.js \
firefox-52.6.0esr/modules/libpref/init/all.js
--- ../tmp/firefox-52.6.0esr/modules/libpref/init/all.js    2017-07-08
    00:17:52.000000000 +0800
+++ firefox-52.6.0esr/modules/libpref/init/all.js   2018-03-27
    12:07:25.346290131 +0800
@@ -2029,7 +2029,7 @@
 // fallback charset list for Unicode conversion (converting from
     Unicode)
 // currently used for mail send only to handle symbol characters (e.g
     Euro, trademark, smartquotes)
 // for ISO-8859-1
-pref("intl.fallbackCharsetList.ISO-8859-1", "windows-1252");
+pref("intl.fallbackCharsetList.ISO-8859-1", "UTF-8");
 pref("font.language.group",                 "chrome://global/locale/
     intl.properties");

 // Android-specific pref to use key-events-only mode for IME-unaware
     webapps.
@@ -2894,149 +2894,149 @@
 pref("font.default.ar", "sans-serif");
 pref("font.minimum-size.ar", 0);
 pref("font.size.variable.ar", 16);
-pref("font.size.fixed.ar", 13);
+pref("font.size.fixed.ar", 14);

 pref("font.default.el", "serif");
 pref("font.minimum-size.el", 0);
```

```
 pref("font.size.variable.el", 16);
-pref("font.size.fixed.el", 13);
+pref("font.size.fixed.el", 14);

 pref("font.default.he", "sans-serif");
 pref("font.minimum-size.he", 0);
 pref("font.size.variable.he", 16);
-pref("font.size.fixed.he", 13);
+pref("font.size.fixed.he", 14);

 pref("font.default.ja", "sans-serif");
 pref("font.minimum-size.ja", 0);
 pref("font.size.variable.ja", 16);
-pref("font.size.fixed.ja", 16);
+pref("font.size.fixed.ja", 14);

 pref("font.default.ko", "sans-serif");
 pref("font.minimum-size.ko", 0);
 pref("font.size.variable.ko", 16);
-pref("font.size.fixed.ko", 16);
+pref("font.size.fixed.ko", 14);

 pref("font.default.th", "sans-serif");
 pref("font.minimum-size.th", 0);
 pref("font.size.variable.th", 16);
-pref("font.size.fixed.th", 13);
+pref("font.size.fixed.th", 14);

 pref("font.default.x-cyrillic", "serif");
 pref("font.minimum-size.x-cyrillic", 0);
 pref("font.size.variable.x-cyrillic", 16);
-pref("font.size.fixed.x-cyrillic", 13);
+pref("font.size.fixed.x-cyrillic", 14);

 pref("font.default.x-devanagari", "serif");
 pref("font.minimum-size.x-devanagari", 0);
 pref("font.size.variable.x-devanagari", 16);
-pref("font.size.fixed.x-devanagari", 13);
+pref("font.size.fixed.x-devanagari", 14);

 pref("font.default.x-tamil", "serif");
 pref("font.minimum-size.x-tamil", 0);
 pref("font.size.variable.x-tamil", 16);
-pref("font.size.fixed.x-tamil", 13);
+pref("font.size.fixed.x-tamil", 14);

 pref("font.default.x-armn", "serif");
 pref("font.minimum-size.x-armn", 0);
 pref("font.size.variable.x-armn", 16);
-pref("font.size.fixed.x-armn", 13);
+pref("font.size.fixed.x-armn", 14);

 pref("font.default.x-beng", "serif");
 pref("font.minimum-size.x-beng", 0);
```

```
 pref("font.size.variable.x-beng", 16);
-pref("font.size.fixed.x-beng", 13);
+pref("font.size.fixed.x-beng", 14);

 pref("font.default.x-cans", "serif");
 pref("font.minimum-size.x-cans", 0);
 pref("font.size.variable.x-cans", 16);
-pref("font.size.fixed.x-cans", 13);
+pref("font.size.fixed.x-cans", 14);

 pref("font.default.x-ethi", "serif");
 pref("font.minimum-size.x-ethi", 0);
 pref("font.size.variable.x-ethi", 16);
-pref("font.size.fixed.x-ethi", 13);
+pref("font.size.fixed.x-ethi", 14);

 pref("font.default.x-geor", "serif");
 pref("font.minimum-size.x-geor", 0);
 pref("font.size.variable.x-geor", 16);
-pref("font.size.fixed.x-geor", 13);
+pref("font.size.fixed.x-geor", 14);

 pref("font.default.x-gujr", "serif");
 pref("font.minimum-size.x-gujr", 0);
 pref("font.size.variable.x-gujr", 16);
-pref("font.size.fixed.x-gujr", 13);
+pref("font.size.fixed.x-gujr", 14);

 pref("font.default.x-guru", "serif");
 pref("font.minimum-size.x-guru", 0);
 pref("font.size.variable.x-guru", 16);
-pref("font.size.fixed.x-guru", 13);
+pref("font.size.fixed.x-guru", 14);

 pref("font.default.x-khmr", "serif");
 pref("font.minimum-size.x-khmr", 0);
 pref("font.size.variable.x-khmr", 16);
-pref("font.size.fixed.x-khmr", 13);
+pref("font.size.fixed.x-khmr", 14);

 pref("font.default.x-mlym", "serif");
 pref("font.minimum-size.x-mlym", 0);
 pref("font.size.variable.x-mlym", 16);
-pref("font.size.fixed.x-mlym", 13);
+pref("font.size.fixed.x-mlym", 14);

 pref("font.default.x-orya", "serif");
 pref("font.minimum-size.x-orya", 0);
 pref("font.size.variable.x-orya", 16);
-pref("font.size.fixed.x-orya", 13);
+pref("font.size.fixed.x-orya", 14);

 pref("font.default.x-telu", "serif");
 pref("font.minimum-size.x-telu", 0);
```

```
134  pref("font.size.variable.x-telu", 16);
    -pref("font.size.fixed.x-telu", 13);
136 +pref("font.size.fixed.x-telu", 14);

138  pref("font.default.x-knda", "serif");
     pref("font.minimum-size.x-knda", 0);
140  pref("font.size.variable.x-knda", 16);
    -pref("font.size.fixed.x-knda", 13);
142 +pref("font.size.fixed.x-knda", 14);

144  pref("font.default.x-sinh", "serif");
     pref("font.minimum-size.x-sinh", 0);
146  pref("font.size.variable.x-sinh", 16);
    -pref("font.size.fixed.x-sinh", 13);
148 +pref("font.size.fixed.x-sinh", 14);

150  pref("font.default.x-tibt", "serif");
     pref("font.minimum-size.x-tibt", 0);
152  pref("font.size.variable.x-tibt", 16);
    -pref("font.size.fixed.x-tibt", 13);
154 +pref("font.size.fixed.x-tibt", 14);

156  pref("font.default.x-unicode", "serif");
     pref("font.minimum-size.x-unicode", 0);
158  pref("font.size.variable.x-unicode", 16);
    -pref("font.size.fixed.x-unicode", 13);
160 +pref("font.size.fixed.x-unicode", 14);

162  pref("font.default.x-western", "serif");
     pref("font.minimum-size.x-western", 0);
164  pref("font.size.variable.x-western", 16);
    -pref("font.size.fixed.x-western", 13);
166 +pref("font.size.fixed.x-western", 14);

168  pref("font.default.zh-CN", "sans-serif");
     pref("font.minimum-size.zh-CN", 0);
170  pref("font.size.variable.zh-CN", 16);
    -pref("font.size.fixed.zh-CN", 16);
172 +pref("font.size.fixed.zh-CN", 14);

174  pref("font.default.zh-HK", "sans-serif");
     pref("font.minimum-size.zh-HK", 0);
176  pref("font.size.variable.zh-HK", 16);
    -pref("font.size.fixed.zh-HK", 16);
178 +pref("font.size.fixed.zh-HK", 14);

180  pref("font.default.zh-TW", "sans-serif");
     pref("font.minimum-size.zh-TW", 0);
182  pref("font.size.variable.zh-TW", 16);
    -pref("font.size.fixed.zh-TW", 16);
184 +pref("font.size.fixed.zh-TW", 14);

186  // mathml.css sets font-size to "inherit" and font-family to "serif" so
         only
```

```
 // font.name.*.x-math and font.minimum-size.x-math are really relevant.
 pref("font.default.x-math", "serif");
 pref("font.minimum-size.x-math", 0);
 pref("font.size.variable.x-math", 16);
-pref("font.size.fixed.x-math", 13);
+pref("font.size.fixed.x-math", 14);

 /*
  * A value greater than zero enables font size inflation for
@@ -4026,17 +4026,17 @@
 pref("font.name.serif.ar", "serif");
 pref("font.name.sans-serif.ar", "sans-serif");
 pref("font.name.monospace.ar", "monospace");
-pref("font.size.fixed.ar", 12);
+pref("font.size.fixed.ar", 14);

 pref("font.name.serif.el", "serif");
 pref("font.name.sans-serif.el", "sans-serif");
 pref("font.name.monospace.el", "monospace");
-pref("font.size.fixed.el", 12);
+pref("font.size.fixed.el", 14);

 pref("font.name.serif.he", "serif");
 pref("font.name.sans-serif.he", "sans-serif");
 pref("font.name.monospace.he", "monospace");
-pref("font.size.fixed.he", 12);
+pref("font.size.fixed.he", 14);

 pref("font.name.serif.ja", "serif");
 pref("font.name.sans-serif.ja", "sans-serif");
@@ -4066,7 +4066,7 @@
 pref("font.name.serif.x-cyrillic", "serif");
 pref("font.name.sans-serif.x-cyrillic", "sans-serif");
 pref("font.name.monospace.x-cyrillic", "monospace");
-pref("font.size.fixed.x-cyrillic", 12);
+pref("font.size.fixed.x-cyrillic", 14);

 pref("font.name.serif.x-devanagari", "serif");
 pref("font.name.sans-serif.x-devanagari", "sans-serif");
@@ -4123,12 +4123,12 @@
 pref("font.name.serif.x-unicode", "serif");
 pref("font.name.sans-serif.x-unicode", "sans-serif");
 pref("font.name.monospace.x-unicode", "monospace");
-pref("font.size.fixed.x-unicode", 12);
+pref("font.size.fixed.x-unicode", 14);

 pref("font.name.serif.x-western", "serif");
 pref("font.name.sans-serif.x-western", "sans-serif");
 pref("font.name.monospace.x-western", "monospace");
-pref("font.size.fixed.x-western", 12);
+pref("font.size.fixed.x-western", 14);

 pref("font.name.serif.zh-CN", "serif");
 pref("font.name.sans-serif.zh-CN", "sans-serif");
```

```
@@ -4182,21 +4182,21 @@
 #if defined(ANDROID) || defined(MOZ_B2G)

-pref("font.size.fixed.ar", 12);
+pref("font.size.fixed.ar", 14);

 pref("font.default.el", "sans-serif");
-pref("font.size.fixed.el", 12);
+pref("font.size.fixed.el", 14);

-pref("font.size.fixed.he", 12);
+pref("font.size.fixed.he", 14);

 pref("font.default.x-cyrillic", "sans-serif");
-pref("font.size.fixed.x-cyrillic", 12);
+pref("font.size.fixed.x-cyrillic", 14);

 pref("font.default.x-unicode", "sans-serif");
-pref("font.size.fixed.x-unicode", 12);
+pref("font.size.fixed.x-unicode", 14);

 pref("font.default.x-western", "sans-serif");
-pref("font.size.fixed.x-western", 12);
+pref("font.size.fixed.x-western", 14);

 # ANDROID || MOZ_B2G
 #endif
```

16. toolkit 語系增加 en-US。

```
[dywang@dyw219 SOURCES]$ vim firefox-52.6.0esr/toolkit/locales/all-
    locales
[dywang@dyw219 SOURCES]$ diff -uN ../tmp/firefox-52.6.0esr/toolkit/
    locales/all-locales \
firefox-52.6.0esr/toolkit/locales/all-locales
--- ../tmp/firefox-52.6.0esr/toolkit/locales/all-locales    2017-04-11
    10:13:23.000000000 +0800
+++ firefox-52.6.0esr/toolkit/locales/all-locales   2018-03-27
    12:05:53.279283125 +0800
@@ -12,3 +12,4 @@
 ro
 sv-SE
 ru
+en-US
```

17. 增加 zh-TW 可用語系。

```
[dywang@dyw219 SOURCES]$ vim firefox-52.6.0esr/toolkit/locales/\
```

```
en-US/chrome/global/intl.properties
[dywang@dyw219 SOURCES]$ diff -uN ../tmp/firefox-52.6.0esr/toolkit/\
locales/en-US/chrome/global/intl.properties firefox-52.6.0esr/toolkit/\
locales/en-US/chrome/global/intl.properties
--- ../tmp/firefox-52.6.0esr/toolkit/locales/en-US/chrome/global/
intl.properties2017-04-11 10:13:23.000000000 +0800
+++ firefox-52.6.0esr/toolkit/locales/en-US/chrome/global/intl.
    properties
2018-03-27 12:10:20.815303485 +0800
@@ -30,7 +30,7 @@
 # British English in their list, since those languages are commonly
     spoken in
 # the same area as Breton:
 # intl.accept_languages=br, fr-FR, fr, en-GB, en
-intl.accept_languages=en-US, en
+intl.accept_languages=en-US, en, zh-TW

 # LOCALIZATION NOTE (font.language.group):
```

18. 系統預設使用 UTF-8 編碼。

```
[dywang@dyw219 SOURCES]$ vim firefox-52.6.0esr/toolkit/locales/en-US/
    chrome/\
global-platform/unix/intl.properties
[dywang@dyw219 SOURCES]$ echo intl.charset.default=UTF-8 >> firefox
    -52.6.0esr/\
toolkit/locales/en-US/chrome/global-platform/unix/intl.properties
[dywang@dyw219 SOURCES]$ diff -uN ../tmp/firefox-52.6.0esr/toolkit/
    locales/en-US/\
chrome/global-platform/unix/intl.properties firefox-52.6.0esr/toolkit/
    locales/en-US/\
chrome/global-platform/unix/intl.properties
--- ../tmp/firefox-52.6.0esr/toolkit/locales/en-US/chrome/global-
    platform/unix/intl.properties
2017-04-11 10:13:23.000000000 +0800
+++ firefox-52.6.0esr/toolkit/locales/en-US/chrome/global-platform/unix/
    intl.properties
2018-03-27 12:13:12.387316542 +0800
@@ -5,3 +5,4 @@
 # LOCALIZATION NOTE (intl.ellipsis): Use the unicode ellipsis char, \
     u2026,
 # or use "..." if \u2026 doesn't suit traditions in your locale.
 intl.ellipsis=…
+intl.charset.default=UTF-8
```

19. 修改預設首頁到個人網頁。

```
[dywang@dyw219 SOURCES]$ vim firefox-centos-default-prefs.js
[dywang@dyw219 SOURCES]$ sed -i \
```

```
's|\(startup.homepage.*\",\ *\"\).*\"|\1http://dywang.csie.cyut.edu.tw
    \"|g' \
firefox-centos-default-prefs.js
[dywang@dyw219 SOURCES]$ diff -uN ../tmp/firefox-centos-default-prefs.js
     \
firefox-centos-default-prefs.js
--- ../tmp/firefox-centos-default-prefs.js  2018-01-25
    02:55:04.000000000 +0800
+++ firefox-centos-default-prefs.js 2018-03-27 12:16:40.905332411 +0800
@@ -14,10 +14,10 @@
 pref("dom.ipc.plugins.enabled.nswrapper*",  false);
 pref("network.manage-offline-status",       true);
 pref("toolkit.networkmanager.disable",      false);
-pref("browser.startup.homepage",            "data:text/plain,browser.
    startup.homepage=file:///usr/share/doc/HTML/index.html");
+pref("browser.startup.homepage",            "http://dywang.csie.cyut.
    edu.tw");
 pref("toolkit.storage.synchronous",         0);
-pref("startup.homepage_override_url",       "http://www.centos.org");
-pref("startup.homepage_welcome_url",        "http://www.centos.org");
+pref("startup.homepage_override_url",       "http://dywang.csie.cyut.
    edu.tw");
+pref("startup.homepage_welcome_url",        "http://dywang.csie.cyut.
    edu.tw");
 pref("extensions.shownSelectionUI",         true);
 /* Workaround for rhbz#1110291 */
 pref("network.negotiate-auth.allow-insecure-ntlm-v1", true);
```

20. 重新打包壓縮 firefox-52.6.0esr 目錄。

```
[dywang@dyw219 SOURCES]$ tar Jcvf firefox-52.6.0esr.source.tar.xz
    firefox-52.6.0esr
```

21. 再同時建立 RPM 及 SRPM 二進位檔字，firefox RPM 建立要 1 小時以上，要耐心等候。成功建立的訊息最後幾行，看到產生 firefox firefox-debuginfo 二個 RPM 檔及一個 firefox SRPM 檔。

```
[dywang@dyw219 SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
    SPECS/firefox.spec
Building target platforms: x86_64
Building for target x86_64
Executing(%prep): /bin/sh -e /var/tmp/rpm-tmp.5HsccJ
+ umask 022
+ cd /home/dywang/rpmbuild/BUILD
.....................
BUILDROOT/firefox-52.6.0-1.el6.dyw.x86_64
Wrote: /home/dywang/rpmbuild/SRPMS/firefox-52.6.0-1.el6.dyw.src.rpm
Wrote: /home/dywang/rpmbuild/RPMS/x86_64/firefox-52.6.0-1.el6.dyw.x86_64
    .rpm
```

```
Wrote: /home/dywang/rpmbuild/RPMS/x86_64/firefox-debuginfo-52.6.0-1.el6.
    dyw.x86_64.rpm
Executing(%clean): /bin/sh -e /var/tmp/rpm-tmp.DN7HlZ
+ umask 022
+ cd /home/dywang/rpmbuild/BUILD
+ cd firefox-52.6.0
+ /bin/rm -rf /home/dywang/rpmbuild/BUILDROOT/firefox-52.6.0-1.el6.dyw.
    x86_64
+ exit 0
Executing(--clean): /bin/sh -e /var/tmp/rpm-tmp.4gcWdU
+ umask 022
+ cd /home/dywang/rpmbuild/BUILD
+ rm -rf firefox-52.6.0
+ exit 0
```

18.17 libgnome 套件實例

1. 下載 SRPM 套件

```
[dywang@dywH ~]$ cd rpmbuild
[dywang@dywH rpmbuild]$ wget ftp://ftp.pbone.net/mirror/vault.centos.org
    \
/6.0/os/SRPMS/Packages/libgnome-2.28.0-11.el6.src.rpm
```

2. 安裝 SRPM 套件

```
[dywang@dywH rpmbuild]$ rpm -ivh libgnome-2.28.0-11.el6.src.rpm
```

3. 至原始碼目錄中查看檔案。

```
[dywang@dywH SOURCES]$ ls libgnome-*
libgnome-2.11.1-scoreloc.patch
libgnome-2.19.1-default-settings.patch
libgnome-2.22.0-default-sound-effects.patch
libgnome-2.24.1-default-noblink.patch
libgnome-2.28.0.tar.bz2
libgnome-2.7.2-default-cursor.patch
libgnome-2.8.0-default-browser.patch
libgnome-translations.patch
```

4. 解壓縮原始碼 tarball，產生 libgnome-2.28.0 目錄，存放原始碼。

```
[dywang@dywH SOURCES]$ tar jxvf libgnome-2.28.0.tar.bz2
```

5. 至 libgnome-2.28.0 目錄，查看檔案。

```
[dywang@dywH SOURCES]$ ls libgnome-2.28.0
aclocal.m4    configure     gtk-doc.make     Makefile.am    po
AUTHORS       configure.in  install-sh       Makefile.in    README
ChangeLog     COPYING.LIB   libgnome         missing        schemas
config.guess  depcomp       libgnome-zip.in  mkinstalldirs
config.h.in   doc           ltmain.sh        monikers
config.sub    gnome-data    MAINTAINERS      NEWS
```

6. 修改 RPM spec 規格檔，版本加入 dyw。

```
[dywang@dywH SOURCES]$ vim ../SPECS/libgnome.spec
[dywang@dywH SOURCES]$ grep dyw ../SPECS/libgnome.spec
Release: 11%{?dist}.dyw
```

7. 修改預設 gnome 佈景主題爲 Clearlooks。

```
[dywang@dywH SOURCES]$ vim libgnome-2.19.1-default-settings.patch
[dywang@dywH SOURCES]$ grep Clearlooks libgnome-2.19.1-default-settings.
   patch -B6
+++ libgnome-2.19.1/schemas/desktop_gnome_interface.schemas.in.in
   2007-08-11 23:55:43.000000000 -0400
@@ -130,7 +130,7 @@
       <applyto>/desktop/gnome/interface/icon_theme</applyto>
       <owner>gnome</owner>
       <type>string</type>
-      <default>gnome</default>
+      <default>Clearlooks</default>
```

8. 重新建立 RPM 二進位檔，出現相依套件問題。

```
[dywang@dywH SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
   SPECS/libgnome.spec
Building target platforms: x86_64
Building for target x86_64
error: Failed build dependencies:
    libbonobo-devel >= 2.13.0 is needed by libgnome-2.28.0-11.el6.dyw.
       x86_64
    GConf2-devel >= 2.14 is needed by libgnome-2.28.0-11.el6.dyw.x86_64
```

```
    gnome-vfs2-devel >= 2.5.3 is needed by libgnome-2.28.0-11.el6.dyw.
        x86_64
    ORBit2-devel >= 2.5.1 is needed by libgnome-2.28.0-11.el6.dyw.x86_64
    libxslt-devel >= 1.0.19 is needed by libgnome-2.28.0-11.el6.dyw.
        x86_64
    intltool is needed by libgnome-2.28.0-11.el6.dyw.x86_64
    popt-devel is needed by libgnome-2.28.0-11.el6.dyw.x86_64
```

9. 先安裝相依套件。

```
[dywang@dywH SOURCES]$ sudo yum install libbonobo-devel GConf2-devel
    gnome-vfs2-devel ORBit2-devel libxslt-devel intltool popt-devel
```

10. 再重新建立 RPM 二進位檔，出現相依套件問題。

```
[dywang@dywH SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
    SPECS/libgnome.spec
```

11. 查看建立的 RPM 二進位檔。

```
[dywang@dywH SOURCES]$ ls ../RPMS/x86_64/libgnome-* ../SRPMS/libgnome-*
../RPMS/x86_64/libgnome-2.28.0-11.el6.dyw.x86_64.rpm
../RPMS/x86_64/libgnome-devel-2.28.0-11.el6.dyw.x86_64.rpm
../SRPMS/libgnome-2.28.0-11.el6.dyw.src.rpm
```

18.18 gnome-panel 套件實例

1. 下載 SRPM 套件

```
[dywang@dywH ~]$ cd rpmbuild
[dywang@dywH rpmbuild]$ wget ftp://ftp.pbone.net/mirror/vault.centos.org
    /\
6.4/cr/Source/SPackages/gnome-panel-2.30.2-15.el6.src.rpm
```

2. 安裝 SRPM 套件

```
[dywang@dywH rpmbuild]$ rpm -ivh gnome-panel-2.30.2-15.el6.src.rpm
```

3. 至原始碼目錄中查看檔案。

```
[dywang@dywH SOURCES]$ ls gnome-panel-*
gnome-panel-2.10.1-speak-to-us-ye-old-wise-fish.patch
gnome-panel-2.21.92-allow-spurious-view-done-signals.patch
gnome-panel-2.30.2.tar.bz2
gnome-panel-about.patch
gnome-panel-dir-prefix.patch
gnome-panel-doc-category.patch
gnome-panel-translations2.patch
gnome-panel-translations.patch
gnome-panel-vendor.patch
```

4. 解壓縮原始碼 tarball，產生 libgnome-2.28.0 目錄，存放原始碼。

```
[dywang@dywH SOURCES]$ tar jxvf gnome-panel-2.30.2.tar.bz2
```

5. 至 gnome-panel-2.30.2 目錄，查看檔案。

```
[dywang@dywH SOURCES]$ ls gnome-panel-2.30.2
aclocal.m4          configure.in          help              Makefile.in
applets             COPYING               icons             man
AUTHORS             COPYING-DOCS          idl               missing
ChangeLog           COPYING.LIB           INSTALL           mkinstalldirs
ChangeLog.pre-git   depcomp               install-sh        NEWS
compile             doc                   libpanel-applet   po
config.guess        gnome-doc-utils.make  ltmain.sh         README
config.h.in         gnome-panel           m4
config.sub          gtk-doc.make          MAINTAINERS
configure           HACKING               Makefile.am
```

6. 修改 RPM spec 規格檔，版本加入 dyw。

```
[dywang@dywH SOURCES]$ vim ../SPECS/gnome-panel.spec
[dywang@dywH SOURCES]$ grep dyw ../SPECS/gnome-panel.spec
Release: 14%{?dist}.dyw
```

7. 使用 SOURCE 中的 panel-default-setup.entries，而不要從目前系統中複製 panel-default-setup.entries。

```
[dywang@dywH SOURCES]$ grep SOURCE3 ../SPECS/gnome-panel.spec
#cp -f %{SOURCE3} gnome-panel/panel-default-setup.entries
```

8. 修改預設 gnome panel 預設的 email 爲 gnome-terminal，瀏覽器爲 firefox。

```
[dywang@dywH SOURCES]$ diff -urNwbBE ../gnome-panel-2.30.2/\
gnome-panel/panel-default-setup.entries gnome-panel-2.30.2/\
gnome-panel/panel-default-setup.entries
--- ../gnome-panel-2.30.2/gnome-panel/panel-default-setup.entries
    2010-02-09 20:32:08.000000000 +0800
+++ gnome-panel-2.30.2/gnome-panel/panel-default-setup.entries
    2015-07-30 14:29:12.305435608 +0800
@@ -261,7 +261,7 @@
       <key>objects/browser_launcher/launcher_location</key>
       <schema_key>/schemas/apps/panel/objects/launcher_location</
           schema_key>
       <value>
-        <string>epiphany.desktop</string>
+        <string>firefox.desktop</string>
       </value>
     </entry>

@@ -315,7 +315,7 @@
       <key>objects/email_launcher/launcher_location</key>
       <schema_key>/schemas/apps/panel/objects/launcher_location</
           schema_key>
       <value>
-        <string>evolution.desktop</string>
+        <string>gnome-terminal.desktop</string>
       </value>
     </entry>
```

9. 重新打包壓縮 gnome-panel-e.30.2.tar.gz。

```
[dywang@dywH SOURCES]$ tar jcvf gnome-panel-2.30.2.tar.bz2 gnome-panel
    -2.30.2
```

10. 重新建立 RPM 二進位檔。

```
[dywang@dywH SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
    SPECS/gnome-panel.spec
```

11. 查看建立的 RPM 二進位檔。

```
[dywang@dywH SOURCES]$ ls ../RPMS/x86_64/gnome-panel-* ../SRPMS/gnome-
    panel-*
../RPMS/x86_64/gnome-panel-2.30.2-15.el6.dyw.x86_64.rpm
../RPMS/x86_64/gnome-panel-debuginfo-2.30.2-15.el6.dyw.x86_64.rpm
```

```
../RPMS/x86_64/gnome-panel-devel-2.30.2-15.el6.dyw.x86_64.rpm
../RPMS/x86_64/gnome-panel-libs-2.30.2-15.el6.dyw.x86_64.rpm
../SRPMS/gnome-panel-2.30.2-15.el6.dyw.src.rpm
```

18.19 gtk2-engines 套件實例

1. 下載 SRPM 套件

```
[dywang@dywH ~]$ cd rpmbuild
[dywang@dywH rpmbuild]$ wget ftp://ftp.pbone.net/mirror/vault.centos.org
    /6.3\
/os/Source/SPackages/gtk2-engines-2.18.4-5.el6.centos.src.rpm
```

2. 查看安裝的所有檔案。

```
[dywang@dywH rpmbuild]$ rpm -qpl gtk2-engines-2.18.4-5.el6.centos.src.
    rpm
gtk-engines-2.18.2-change-bullet.patch
gtk-engines-2.18.4.tar.bz2
gtk2-engines.spec
tooltips.patch
```

3. 安裝 SRPM 套件

```
[dywang@dywH rpmbuild]$ rpm -ivh gtk2-engines-2.18.4-5.el6.centos.src.
    rpm
```

4. 查看程式主要的打包壓縮檔。

```
[dywang@dywH rpmbuild]$ cd SOURCES/
[dywang@dywH SOURCES]$ ls gtk-engines-2.18.4.tar.bz2
gtk-engines-2.18.4.tar.bz2
```

5. 切換到暫存目錄，不安裝 rpm 檔下抽取 rpm 檔，做爲修改前後之比較。

```
[dywang@dywH tmp]$ rpm2cpio ../gtk2-engines-2.18.4-5.el6.centos.src.rpm
    | cpio -idvm
gtk-engines-2.18.2-change-bullet.patch
gtk-engines-2.18.4.tar.bz2
```

```
gtk2-engines.spec
tooltips.patch
1416 blocks
```

6. 暫存目錄下解開 gtk-engines-2.18.4.tar.bz2。

```
[dywang@dywH tmp]$ tar jxvf gtk-engines-2.18.4.tar.bz2
```

7. 查看 gtk-engines-2.18.4 目錄的檔案。

```
[dywang@dywH SOURCES]$ ls ../tmp/gtk-engines-2.18.4
aclocal.m4    configure.ac         INSTALL              missing
AUTHORS       COPYING              install-sh           NEWS
autogen.sh    depcomp              intltool-extract.in  po
ChangeLog     engines              intltool-merge.in    README
compile       gtk-engines-2.pc.in  intltool-update.in  schema
config.guess  gtk-engines.doap     ltmain.sh            test
config.sub    gtk-engines.spec     Makefile.am          themes
configure     gtk-engines.spec.in  Makefile.in
```

8. 將要修改的 gtkrc 複製到到工作目錄。

```
[dywang@dywH SOURCES]$ cp ../tmp/gtk-engines-2.18.4/themes/Clearlooks/
    gtk-2.0/gtkrc mygtkrc
```

9. 修改 mygtkrc 後將修改前後 patch 存成 gtk-engines-2.18.4-gtkrc.patch。

```
[dywang@dywH SOURCES]$ vim mygtkrc
[dywang@dywH SOURCES]$ diff -uN ../tmp/gtk-engines-2.18.4/themes/
    Clearlooks/gtk-2.0/gtkrc mygtkrc \
> gtk-engines-2.18.4-gtkrc.patch
```

10. 修改預設顏色。

```
[dywang@dywH SOURCES]$ diff -uN gtk-engines-2.18.4/themes/Clearlooks/gtk
    -2.0/gtkrc gtkrc.my > gtk-engines-2.18.4-gtkrc.patch
[dywang@dywH SOURCES]$ cat gtk-engines-2.18.4-gtkrc.patch
--- gtk-engines-2.18.4/themes/Clearlooks/gtk-2.0/gtkrc  2015-09-28
    14:55:13.731393117 +0800
+++ gtkrc.my    2015-09-28 14:50:41.371393424 +0800
@@ -1,7 +1,7 @@
```

```
 # Please keep this gtkrc in sync with the other ones from Clearlooks
     based themes.

-gtk-color-scheme = "base_color:#ffffff\nfg_color:#000000\
    ntooltip_fg_color:#000000\nselected_bg_color:#86ABD9\n\
selected_fg_color:#ffffff\ntext_color:#1A1A1A\nbg_color:#EDECEB\
    ntooltip_bg_color:#F5F5B5"
+gtk-color-scheme = "base_color:#ffffff\nfg_color:#000000\
    ntooltip_fg_color:#000000\nselected_bg_color:#7cd39cec90a8\n\
selected_fg_color:#ffffff\ntext_color:#1A1A1A\nbg_color:#d9d9e147dce2\
    ntooltip_bg_color:#d5d5dadadede"

 style "default" {
    xthickness = 1
```

11. 修改 slider 寬度及大小。

```
@@ -19,8 +19,8 @@
    GtkPaned::handle-size = 6

    GtkRange::trough-border = 0
-   GtkRange::slider-width = 15
-   GtkRange::stepper-size = 15
+   GtkRange::slider-width = 14
+   GtkRange::stepper-size = 14

    GtkScale::slider-length = 23
    GtkScale::trough-side-details = 1
```

12. 修改 notebook (例如 gnome-terminals 的 TAB 新增分頁) 上下左右尺寸。原先 gnome-terminals tab 佔用畫面太大，修改成上下左右不留空白。

```
@@ -176,8 +176,8 @@
 # The color is changed by the notebook_bg style, this style
 # changes the x/ythickness
 style "notebook" {
-   xthickness = 3
-   ythickness = 3
+   xthickness = 0
+   ythickness = 0
 }

 style "statusbar" {
```

13. 修改預設選單選項上下左右寬度。

```
@@ -216,8 +216,8 @@
 }

 style "menu_item" {
-   xthickness = 2
-   ythickness = 3
+   xthickness = 1
+   ythickness = 1

    fg[PRELIGHT]      = @selected_fg_color
 }
```

14. 修改 new-tooltip-style。

```
@@ -277,6 +277,8 @@
    xthickness = 4
    ythickness = 4

+   GtkWidget::new-tooltip-style = 1
+
    bg[NORMAL]        = @tooltip_bg_color
    fg[NORMAL]        = @tooltip_fg_color
 }
```

15. 修改 RPM spec 規格檔版本加入 dyw，且將 gtk-engines-2.18.4-gtkrc.patch 設定爲 Patch1，原先的 patch1 tooltips 也是修改 gtkrc，因而造成新設定的 patch 出問題，故直接取代 patch1。

```
[dywang@dywH SOURCES]$ diff -uN ../tmp/gtk2-engines.spec ../SPECS/gtk2-
    engines.spec
--- ../tmp/gtk2-engines.spec    2010-06-21 21:26:10.000000000 +0800
+++ ../SPECS/gtk2-engines.spec  2015-09-28 14:56:04.392393060 +0800
@@ -1,7 +1,7 @@
 Summary:        Theme engines for GTK+ 2.0
 Name:           gtk2-engines
 Version:        2.18.4
-Release:   5%{?dist}
+Release:   5%{?dist}.dyw
 # for details on which engines are GPL vs LGPL, see COPYING
 License:        LGPLv2+
 Group:          System Environment/Libraries
@@ -21,7 +21,9 @@
 # http://bugzilla.gnome.org/show_bug.cgi?id=593030
 Patch0: gtk-engines-2.18.2-change-bullet.patch

-Patch1: tooltips.patch
+#Patch1: tooltips.patch
```

```
19 +
   +Patch1: gtk-engines-2.18.4-gtkrc.patch
21
    %package devel
23  Summary: Development files for %{name}
   @@ -44,7 +46,8 @@
25  %setup -q -n gtk-engines-%{version}

27  %patch0 -p1 -b .change-bullet
   -%patch1 -p1 -b .tooltips
29 +#%patch1 -p1 -b .tooltips
   +%patch1 -p1 -b .gtkrc
31
    %build
33  %configure
```

16. 建立 RPM 二進位檔，出現相依套件問題，不同的建立環境缺的套件不會相同，必須把缺的套件都安裝起來。

```
1  [dywang@dywH SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
       SPECS/gtk2-engines.spec
   Building target platforms: x86_64
3  Building for target x86_64
   error: Failed build dependencies:
5      intltool is needed by gtk2-engines-2.18.4.dyw-5.el6.x86_64
```

17. 安裝相依套件。

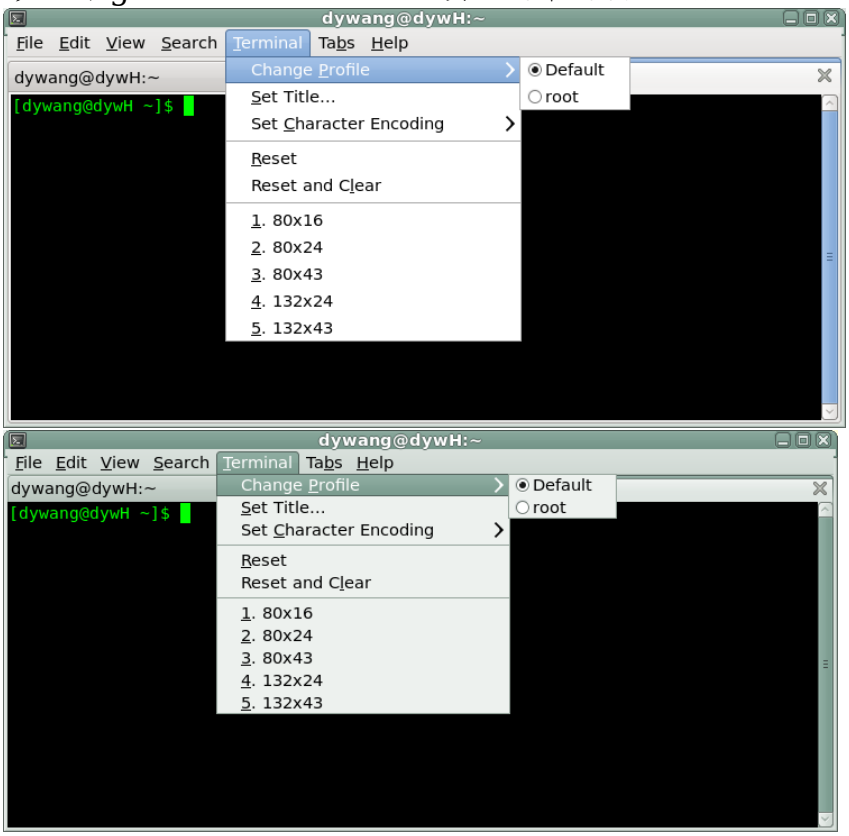
```
1  [dywang@dywH SOURCES]$ sudo yum install intltool --enablerepo=centos
```

18. 再同時建立 RPM 及 SRPM 二進位檔字，成功建立的訊息最後幾行，看到產生三個 RPM 檔及一個 SRPM 檔。

```
1  [dywang@dywH SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
       SPECS/gtk2-engines.spec
   ......................
3  Wrote: /home/dywang/rpmbuild/SRPMS/gtk2-engines-2.18.4-5.el6.dyw.src.rpm
   Wrote: /home/dywang/rpmbuild/RPMS/x86_64/gtk2-engines-2.18.4-5.el6.dyw.
       x86_64.rpm
5  Wrote: /home/dywang/rpmbuild/RPMS/x86_64/gtk2-engines-devel-2.18.4-5.el6
       .dyw.x86_64.rpm
   Wrote: /home/dywang/rpmbuild/RPMS/x86_64/gtk2-engines-debuginfo
       -2.18.4-5.el6.dyw.x86_64.rpm
7  Executing(%clean): /bin/sh -e /var/tmp/rpm-tmp.msMMbL
   + umask 022
```

```
+ cd /home/dywang/rpmbuild/BUILD
+ cd gtk-engines-2.18.4
+ rm -rf /home/dywang/rpmbuild/BUILDROOT/gtk2-engines-2.18.4-5.el6.dyw.
    x86_64
+ exit 0
Executing(--clean): /bin/sh -e /var/tmp/rpm-tmp.UPA63r
+ umask 022
+ cd /home/dywang/rpmbuild/BUILD
+ rm -rf gtk-engines-2.18.4
+ exit 0
```

19. 修改前 gnome-termianl 的分頁、選單選項佔用較大的版面。



18.20 gnome-themes 套件實例

1. 下載 SRPM 套件

```
[dywang@dywH ~]$ cd rpmbuild
[dywang@dywH rpmbuild]$ wget ftp://ftp.pbone.net/mirror/vault.centos.org
    /6.5\
/os/Source/SPackages/gnome-themes-2.28.1-6.el6.src.rpm
```

2. 查看安裝的所有檔案。

```
[dywang@dywH rpmbuild]$ rpm -qpl gnome-themes-2.28.1-6.el6.src.rpm
gnome-themes-2.28.1.tar.bz2
gnome-themes.spec
indic-titlebars.patch
newer-icons.tar
slider-metacity.tar
slider-theme.patch
```

3. 安裝 SRPM 套件

```
[dywang@dywH rpmbuild]$ rpm -ivh gnome-themes-2.28.1-6.el6.src.rpm
```

4. 切換到暫存目錄，不安裝 rpm 檔下抽取 rpm 檔，做爲修改前後之比較。

```
[dywang@dywH tmp]$ rpm2cpio ../gnome-themes-2.28.1-6.el6.src.rpm | cpio
    -idvm
gnome-themes-2.28.1.tar.bz2
gnome-themes.spec
indic-titlebars.patch
newer-icons.tar
slider-metacity.tar
slider-theme.patch
21625 blocks
```

5. 暫存目錄下解開壓縮檔。

```
[dywang@dywH tmp]$ tar jxvf gnome-themes-2.28.1.tar.bz2
```

6. 查看 gnome-themes-2.28.1 目錄的檔案。

```
[dywang@dywH tmp]$ ls gnome-themes-2.28.1
aclocal.m4    configure.in          INSTALL                Makefile.in
AUTHORS       COPYING               install-sh             metacity-
    themes
ChangeLog     desktop-themes        intltool-extract.in    missing
common        gnome-themes.spec     intltool-merge.in
    mkinstalldirs
config.guess  gnome-themes.spec.in  intltool-update.in     NEWS
config.sub    gtk-themes            low-contrast-preset.scm  po
configure     icon-themes           Makefile.am            README
```

7. 將要修改的 gtkrc 複製到到工作目錄。

```
[dywang@dywH SOURCES]$ cp ../tmp/gtk-engines-2.18.4/themes/Clearlooks/
    gtk-2.0/gtkrc mygtkrc
```

8. 修改 Clearlooks 佈景主題抬頭高度並將其差異存成 gnome-themes-Clearlooks.patch，其中 metacity-theme-1-0.xml 爲未修改前安裝在系統的的檔案，也就是編譯時經過 patch 補丁過的檔案，metacity-theme-1-0.xml 則是將其修改後的檔案。注意：必須將補丁檔中的 metacity-theme-1-0.xml 改成 gnome-themes-2.28.1/metacity-themes/Clearlooks/metacity-theme-1.xml，否則編譯時會找不到檔案。

```
[dywang@dywH SOURCES]$ diff -uN metacity-theme-1-0.xml metacity-theme-1-
    my.xml > gnome-themes-Clearlooks.patch
[dywang@dywH SOURCES]$ cat gnome-themes-Clearlooks.patch
--- metacity-theme-1-0.xml  2015-09-28 23:14:13.778276989 +0800
--- gnome-themes-2.28.1/metacity-themes/Clearlooks/metacity-theme-1.xml
    2015-09-28 23:14:13.778276989 +0800
+++ metacity-theme-1-my.xml 2015-09-28 23:14:27.104667297 +0800
@@ -18,8 +18,8 @@
     <distance name="right_titlebar_edge" value="4"/>
     <aspect_ratio name="button" value="1.0"/>
     <distance name="title_vertical_pad" value="0"/>
-    <border name="title_border" left="2" right="2" top="4" bottom="3"/>
-    <border name="button_border" left="1" right="1" top="2" bottom="2"/>
+    <border name="title_border" left="1" right="1" top="0" bottom="0"/>
+    <border name="button_border" left="1" right="1" top="1" bottom="1"/>
  </frame_geometry>

  <frame_geometry name="shaded" parent="normal" rounded_top_left="true"
     rounded_top_right="true" rounded_bottom_left="true"
     rounded_bottom_right="true"/>
@@ -46,14 +46,14 @@
  </frame_geometry>

  <frame_geometry name="border" has_title="false">
-    <distance name="left_width" value="4"/>
-    <distance name="right_width" value="4"/>
-    <distance name="bottom_height" value="4"/>
+    <distance name="left_width" value="0"/>
+    <distance name="right_width" value="0"/>
+    <distance name="bottom_height" value="0"/>
     <distance name="left_titlebar_edge" value="0"/>
     <distance name="right_titlebar_edge" value="0"/>
     <distance name="button_width" value="0"/>
     <distance name="button_height" value="0"/>
-    <distance name="title_vertical_pad" value="4"/>
+    <distance name="title_vertical_pad" value="0"/>
     <border name="title_border" left="0" right="0" top="0" bottom="0"/>
```

```
    <border name="button_border" left="0" right="0" top="0" bottom="0"/>
</frame_geometry>
```

9. 修改 RPM spec 規格檔版本加入 dyw，因 patch0 主要是修改 Clearlooks 佈景主題，與本次修改目的相同故將本次修改補丁放在其後，也就是 patch11。

```
[dywang@dywH SOURCES]$ diff -uN ../tmp/gnome-themes.spec ../SPECS/gnome-
    themes.spec
--- ../tmp/gnome-themes.spec    2010-07-15 00:05:03.000000000 +0800
+++ ../SPECS/gnome-themes.spec  2015-09-28 23:21:59.428115175 +0800
@@ -1,7 +1,7 @@
 Summary: Themes for GNOME
 Name: gnome-themes
 Version: 2.28.1
-Release: 6%{?dist}
+Release: 6%{?dist}.dyw
 URL: http://download.gnome.org/sources/gnome-themes/
 Source: http://download.gnome.org/sources/gnome-themes/2.28/%{name}-%{
     version}.tar.bz2
 # Icons done by Andreas Nilsson for http://live.gnome.org/GnomeArt/
     ArtRequests/issue26
@@ -10,6 +10,7 @@
 Source10: slider-metacity.tar
 # https://bugzilla.gnome.org/show_bug.cgi?id=614343
 Patch0: indic-titlebars.patch
+Patch1: gnome-themes-Clearlooks.patch
 Patch10: slider-theme.patch
 License: LGPLv2 and GPLv2
 Group: User Interface/Desktops
@@ -38,6 +39,7 @@
 %prep
 %setup -q
 %patch0 -p1 -b .indic-titlebars
+%patch1 -p1 -b .Clearlooks
 %patch10 -p1 -b .slider-theme
 find . -exec touch \{\} \;
```

10. 建立 RPM 二進位檔，出現相依套件問題，不同的建立環境缺的套件不會相同，必須把缺的套件都安裝起來。

```
[dywang@dywH SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
    SPECS/gtk2-engines.spec
Building target platforms: x86_64
Building for target x86_64
error: Failed build dependencies:
    intltool is needed by gtk2-engines-2.18.4.dyw-5.el6.x86_64
```

11. 安裝相依套件。

```
[root@dywH ~]# yum install gtk2-engines-devel icon-naming-utils --
    enablerepo=centos
```

12. 再同時建立 RPM 及 SRPM 二進位檔字，成功建立的訊息最後幾行，看到產生三個 RPM 檔及一個 SRPM 檔。

```
[dywang@dywH SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
    SPECS/gnome-themes.spec
.....................
Wrote: /home/dywang/rpmbuild/SRPMS/gnome-themes-2.28.1-6.el6.dyw.src.rpm
Wrote: /home/dywang/rpmbuild/RPMS/noarch/gnome-themes-2.28.1-6.el6.dyw.
    noarch.rpm
Executing(%clean): /bin/sh -e /var/tmp/rpm-tmp.nwqySf
+ umask 022
+ cd /home/dywang/rpmbuild/BUILD
+ cd gnome-themes-2.28.1
+ rm -rf /home/dywang/rpmbuild/BUILDROOT/gnome-themes-2.28.1-6.el6.dyw.
    x86_64
+ exit 0
Executing(--clean): /bin/sh -e /var/tmp/rpm-tmp.F8sVZU
+ umask 022
+ cd /home/dywang/rpmbuild/BUILD
+ rm -rf gnome-themes-2.28.1
+ exit 0
```

18.21 libgweather 套件實例

1. 緣由：libgweather 套件下載氣象資料，顯示於 gnome 的時鐘面板，但指定的氣象資料網站變動就無法取得氣象資料。

2. 下載 SRPM 套件

```
[dywang@dywmac ~]$ cd rpmbuild
[dywang@dywmac rpmbuild]$ wget https://li.nux.ro/download/nux/tmp/\
libgweather6/x86_64/libgweather-2.28.0-6.el6.nux.src.rpm
```

3. 安裝 SRPM 套件

```
[dywang@dywmac rpmbuild]$ rpm -ivh libgweather-2.28.0-6.el6.nux.src.rpm
```

4. 查看安裝的所有檔案。

```
[dywang@dywmac SOURCES]$ rpm -qpl ../libgweather-2.28.0-6.el6.nux.src.rpm
better-weather-in-montreal.patch
changeprovider.patch
gettext-not-xml.patch
libgweather-2.28.0.tar.bz2
libgweather-add-jerusalem-location.patch
libgweather-translations.patch
libgweather-translations2.patch
libgweather.spec
```

5. 查看程式主要的打包壓縮檔。

```
[dywang@dywmac SOURCES]$ ls libgweather-2.28.0.tar.bz2
libgweather-2.28.0.tar.bz2
```

6. 解壓縮原始碼 tarball，產生 libgweather-2.28.0 目錄，存放原始碼。

```
[dywang@dywmac SOURCES]$ tar jxvf libgweather-2.28.0.tar.bz2
```

7. 查看 libgweather-2.28.0 目錄內的檔案。

```
[dywang@dywmac SOURCES]$ ls libgweather-2.28.0
acinclude.m4  config.h       configure.in  INSTALL      MAINTAINERS
    NEWS
aclocal.m4    config.h.in    COPYING       install-sh   Makefile
    po
AUTHORS       config.log     data          libgweather  Makefile.am
    po-locations
ChangeLog     config.status  depcomp       libtool      Makefile.in
    python
compile       config.sub     doc           ltmain.sh    missing
    README
config.guess  configure      gtk-doc.make  m4           mkinstalldirs
    stamp-h1
```

8. 進入暫存目錄 tmp，解開原始 src.rpm，方便做修改的比對。

```
[dywang@dywmac SOURCES]$ cd ../tmp/
[dywang@dywmac tmp]$ rm ./* -rf
[dywang@dywmac tmp]$ rpm2cpio ../libgweather-2.28.0-6.el6.nux.src.rpm |
    cpio -idvm
```

9. 暫存目錄下解開 bgweather-2.28.0.tar.bz2。

```
[dywang@dywmac tmp]$ tar jxvf libgweather-2.28.0.tar.bz2
```

10. 查看修改了哪些檔案？

```
[dywang@dywmac SOURCES]$ diff -qr ../tmp/libgweather-2.28.0 libgweather
    -2.28.0/ | grep differ
Files ../tmp/libgweather-2.28.0/configure and libgweather-2.28.0/
    configure differ
Files ../tmp/libgweather-2.28.0/configure.in and libgweather-2.28.0/
    configure.in differ
Files ../tmp/libgweather-2.28.0/data/Locations.xml.in and libgweather
    -2.28.0/data/Locations.xml.in differ
Files ../tmp/libgweather-2.28.0/libgweather/gweather-gconf.c and
    libgweather-2.28.0/libgweather/gweather-gconf.c differ
Files ../tmp/libgweather-2.28.0/libgweather/gweather.schemas.in and
    libgweather-2.28.0/libgweather/gweather.schemas.in differ
Files ../tmp/libgweather-2.28.0/libgweather/weather-metar.c and
    libgweather-2.28.0/libgweather/weather-metar.c differ
Files ../tmp/libgweather-2.28.0/po/zh_TW.po and libgweather-2.28.0/po/
    zh_TW.po differ
```

11. 修改 RPM spec 規格檔，版本加入 dyw，取消 patch100 直接修改檔案，安裝後修改 gconf 的預設時區資訊。

```
[dywang@dywmac tmp]$ cd ../SOURCES/
[dywang@dywmac SOURCES]$ vim ../SPECS/libgweather.spec
[dywang@dywmac SOURCES]$ diff -uN ../tmp/libgweather.spec ../SPECS/
    libgweather.spec
--- ../tmp/libgweather.spec 2016-08-25 15:56:19.000000000 +0800
+++ ../SPECS/libgweather.spec   2018-09-08 19:50:22.217329228 +0800
@@ -1,13 +1,13 @@
 Name:           libgweather
 Version:        2.28.0
-Release:        6%{?dist}
+Release:        6%{?dist}.dyw
 Summary:        A library for weather information

 Group:          System Environment/Libraries
 License:        GPLv2+
 URL:            http://www.gnome.org
 Source0:        http://download.gnome.org/sources/libgweather/2.28/%{
    name}-%{version}.tar.bz2
```

```
-Patch100:      changeprovider.patch
+#Patch100:      libgweather-2.28.0-metar.patch

 BuildRoot:      %{_tmppath}/%{name}-%{version}-%{release}-root-%(%{
    __id_u} -n)
@@ -63,7 +63,7 @@
 %patch2 -p1 -b .translations
 %patch3 -p2 -b .translations2
 %patch4 -p1 -b .jerusalem
-%patch100 -p0 -b .changeprovider
+#%patch100 -p0 -b .libgweather-2.28.0-metar

 gtkdocize
 autoreconf -i -f
@@ -87,6 +87,7 @@
 /sbin/ldconfig
 export GCONF_CONFIG_SOURCE=`gconftool-2 --get-default-source`
 gconftool-2 --makefile-install-rule %{_sysconfdir}/gconf/schemas/
    gweather.schemas > /dev/null || :
+sed -ri 's|(<stringvalue>&lt;location).*(</stringvalue>)$|\1 name=\&
    quot;\&quot; city=\&quot;\
+Taichung\&quot; timezone=\&quot;Asia/Taipei\&quot; latitude=\&quot
    ;24.264668\&quot; longitude=\
+\&quot;120.620583\&quot; code=\&quot;RCMQ\&quot; current=\&quot;true\&
    quot;\&gt;\2|g' \
+/etc/gconf/gconf.xml.defaults/%gconf-tree.xml

 %pre
 if [ "$1" -gt 1 ]; then
```

12. 修改預設使用公制單位。

```
[dywang@dywmac SOURCES]$ diff -uN ../tmp/libgweather-2.28.0/configure
    libgweather-2.28.0/configure
--- ../tmp/libgweather-2.28.0/configure 2009-09-22 00:33:19.000000000
    +0800
+++ libgweather-2.28.0/configure    2018-09-08 19:00:28.756537843 +0800
@@ -16477,7 +16477,7 @@
 if test "$gtk_ok" = "yes"; then

 cat >>confdefs.h <<\_ACEOF
-#define HAVE__NL_MEASUREMENT_MEASUREMENT 1
+#define HAVE__NL_MEASUREMENT_MEASUREMENT 0
 _ACEOF

 fi
```

13. 修改原有的台灣城市名稱，並增加台中市 (Taichung)。

```
[dywang@dywmac SOURCES]$ diff -uN ../tmp/libgweather-2.28.0/data/
    Locations.xml.in \
libgweather-2.28.0/data/Locations.xml.in
--- ../tmp/libgweather-2.28.0/data/Locations.xml.in 2009-04-20
    01:41:11.000000000 +0800
+++ libgweather-2.28.0/data/Locations.xml.in    2018-09-08
    15:36:32.443791340 +0800
@@ -5481,36 +5481,49 @@
       <tz-hint>Asia/Taipei</tz-hint>
       <city>
         <!-- A city in Taiwan.
-             The name is also written "高雄市".
+             The name is also written "高雄". RCKH
           -->
-        <_name>Kao-hsiung-shih</_name>
+        <_name>Kaohsiung</_name>
         <coordinates>22.616256 120.313329</coordinates>
         <location>
-          <name>Kao-hsiung-shih International Airport</name>
+          <name>Kaohsiung International Airport</name>
           <code>RCKH</code>
           <coordinates>22.583333 120.350000</coordinates>
         </location>
       </city>
       <city>
         <!-- A city in Taiwan.
-             The name is also written "埔頂".
+             The name is also written "台中". RCMQ
           -->
-        <_name>Pu-ting</_name>
+        <_name>Taichung</_name>
+        <coordinates>24.264667 120.620581</coordinates>
+        <location>
+          <name>Taichung International Airport</name>
+          <code>RCMQ</code>
+          <zone>CST</zone>
+          <coordinates>24.264667 120.620581</coordinates>
+        </location>
+      </city>
+      <city>
+        <!-- A city in Taiwan.
+             The name is also written "桃園". RCTP
+          -->
+        <_name>Taoyuan</_name>
         <coordinates>25.083498 121.215105</coordinates>
         <location>
-          <name>Chiang Kai Shek</name>
+          <name>Taoyuan International Airport</name>
           <code>RCTP</code>
           <coordinates>25.083333 121.216667</coordinates>
         </location>
       </city>
       <city>
```

```
        <!-- The capital of Taiwan.
52  -          The name is also written "臺北市".
    +          The name is also written "臺北市". RCSS
54            -->
    -       <_name>T'ai-pei Shih</_name>
56  +       <_name>Taipei</_name>
        <coordinates>25.047763 121.531846</coordinates>
58      <location>
    -     <name>Sung-shan / T'ai-pei Shih</name>
60  +     <name>Sung-shan / Taipei</name>
          <code>RCSS</code>
62        <coordinates>25.066667 121.550000</coordinates>
        </location>
```

14. 當系統沒有設定時區等資料時，預設位置爲 Taichung。

```
1   [dywang@dywmac SOURCES]$ diff -uN ../tmp/libgweather-2.28.0/libgweather/
        gweather-gconf.c \
    libgweather-2.28.0/libgweather/gweather-gconf.c
3   --- ../tmp/libgweather-2.28.0/libgweather/gweather-gconf.c  2009-06-30
        09:10:32.000000000 +0800
    +++ libgweather-2.28.0/libgweather/gweather-gconf.c 2018-09-08
        16:58:25.437879709 +0800
5   @@ -212,7 +212,7 @@
            if (strcmp ("DEFAULT_LOCATION", _("DEFAULT_LOCATION")))
7               name = g_strdup (_("DEFAULT_LOCATION"));
            else
9   -           name = g_strdup ("Pittsburgh");
    +           name = g_strdup ("Taichung");
11      }

13      code = gweather_gconf_get_string (ctx, "location1", NULL);
    @@ -232,7 +232,7 @@
15          if (strcmp ("DEFAULT_CODE", _("DEFAULT_CODE")))
                code = g_strdup (_("DEFAULT_CODE"));
17          else
    -           code = g_strdup ("KPIT");
19  +           code = g_strdup ("RCMQ");
        }
21

        zone = gweather_gconf_get_string (ctx, "location2", NULL);
```

15. weather-metar.c 是取得氣象資料的主程式，直接修改程式由 www.aviationweather.gov 網站取得氣象資料，不用 patch100 變更，所以 libgweather.spec 中取消 patch100 修補。

```
[dywang@dywmac SOURCES]$ diff -uN ../tmp/libgweather-2.28.0/libgweather/
    weather-metar.c libgweather-2.28.0/libgweather/weather-metar.c
```

```
--- ../tmp/libgweather-2.28.0/libgweather/weather-metar.c   2009-06-04
    22:41:13.000000000 +0800
+++ libgweather-2.28.0/libgweather/weather-metar.c  2018-09-07
    15:29:42.487644049 +0800
@@ -510,7 +510,7 @@

     loc = info->location;

-    searchkey = g_strdup_printf ("\n%s", loc->code);
+    searchkey = g_strdup_printf ("<raw_text>%s", loc->code);
     p = strstr (msg->response_body->data, searchkey);
     g_free (searchkey);
     if (p) {
@@ -522,8 +522,8 @@
         metar = g_strdup (p);
     success = metar_parse (metar, info);
     g_free (metar);
-    } else if (!strstr (msg->response_body->data, "National Weather
    Service")) {
-   /* The response doesn't even seem to have come from NWS...
+    } else if (!strstr (msg->response_body->data, "aviationweather.gov
    ")) {
+   /* The response doesn't even seem to have come from NOAA...
     * most likely it is a wifi hotspot login page. Call that a
     * network error.
     */
@@ -550,9 +550,15 @@
     }

     msg = soup_form_request_new (
-   "GET", "http://weather.noaa.gov/cgi-bin/mgetmetar.pl",
-   "cccc", loc->code,
-   NULL);
+       "GET", "https://www.aviationweather.gov/adds/dataserver_current/
    httpparam",
+       "dataSource", "metars",
+       "requestType", "retrieve",
+       "format", "xml",
+       "hoursBeforeNow", "3",
+       "mostRecent", "true",
+       "fields", "raw_text",
+       "stationString", loc->code,
+       NULL);
     soup_session_queue_message (info->session, msg, metar_finish, info)
         ;

     info->requests_pending++;
```

16. 修改 gconf 預設位置 Taichung，code 爲 RCMQ。

```
[dywang@dywmac SOURCES]$ diff -uN ../tmp/libgweather-2.28.0/libgweather/
    gweather-gconf.c \
```

```
libgweather-2.28.0/libgweather/gweather-gconf.c
--- ../tmp/libgweather-2.28.0/libgweather/gweather-gconf.c  2009-06-30
    09:10:32.000000000 +0800
+++ libgweather-2.28.0/libgweather/gweather-gconf.c 2018-09-08
    16:58:25.437879709 +0800
@@ -212,7 +212,7 @@
         if (strcmp ("DEFAULT_LOCATION", _("DEFAULT_LOCATION")))
             name = g_strdup (_("DEFAULT_LOCATION"));
         else
-            name = g_strdup ("Pittsburgh");
+            name = g_strdup ("Taichung");
     }

     code = gweather_gconf_get_string (ctx, "location1", NULL);
@@ -232,7 +232,7 @@
         if (strcmp ("DEFAULT_CODE", _("DEFAULT_CODE")))
             code = g_strdup (_("DEFAULT_CODE"));
         else
-           code = g_strdup ("KPIT");
+           code = g_strdup ("RCMQ");
     }

     zone = gweather_gconf_get_string (ctx, "location2", NULL);
```

17. 修改語系 zh-TW 預設位置 Taichung。

```
[dywang@dywmac SOURCES]$ diff -uN ../tmp/libgweather-2.28.0/po/zh_TW.po
    \
libgweather-2.28.0/po/zh_TW.po
--- ../tmp/libgweather-2.28.0/po/zh_TW.po   2009-06-04
    22:41:13.000000000 +0800
+++ libgweather-2.28.0/po/zh_TW.po  2018-09-08 17:12:03.395028306 +0800
@@ -38,7 +38,7 @@
 #: ../libgweather/gweather-gconf.c:212 ../libgweather/gweather-gconf.c
     :213
 #: ../libgweather/gweather.schemas.in.h:5
 msgid "DEFAULT_LOCATION"
-msgstr "松山/臺北"
+msgstr "Taichung"

 # zh_HK: msgstr "VHHH"
 # zh_TW: msgstr "RCSS"
@@ -56,7 +56,7 @@
 #: ../libgweather/gweather-gconf.c:232 ../libgweather/gweather-gconf.c
     :233
 #: ../libgweather/gweather.schemas.in.h:3
 msgid "DEFAULT_CODE"
-msgstr "RCSS"
+msgstr "RCMQ"

 #. TRANSLATOR: Change this to the zone of your default location that
```

```
 #. * corresponds to the DEFAULT_LOCATION and DEFAULT_CODE you put above
     .
@@ -108,7 +108,7 @@
 #: ../libgweather/gweather-gconf.c:294 ../libgweather/gweather-gconf.c
     :295
 #: ../libgweather/gweather.schemas.in.h:4
 msgid "DEFAULT_COORDINATES"
-msgstr "25-04N 121-33E"
+msgstr "24-26N 120-62E"

 #: ../libgweather/gweather-prefs.c:34 ../libgweather/gweather-prefs.c
     :45
 #: ../libgweather/gweather-prefs.c:60 ../libgweather/gweather-prefs.c
     :77
```

18. 重新打包壓縮../libgweather-2.28.0 目錄。

```
[dywang@dywmac SOURCES]$ tar jcvf libgweather-2.28.0.tar.bz2 libgweather
    -2.28.0
```

19. 再同時建立 RPM 及 SRPM 二進位檔字，看到產生 libgweather libgweather-devel libgweather-debuginfo 三個 RPM 檔及一個 libgweather SRPM 檔。

```
[dywang@dywmac SOURCES]$ rpmbuild -ba --clean --target=$(uname -m) ../
    SPECS/libgweather.spec
..................
Wrote: /home/dywang/rpmbuild/SRPMS/libgweather-2.28.0-6.el6.dyw.src.rpm
Wrote: /home/dywang/rpmbuild/RPMS/x86_64/libgweather-2.28.0-6.el6.dyw.
    x86_64.rpm
Wrote: /home/dywang/rpmbuild/RPMS/x86_64/libgweather-devel-2.28.0-6.el6.
    dyw.x86_64.rpm
Wrote: /home/dywang/rpmbuild/RPMS/x86_64/libgweather-debuginfo-2.28.0-6.
    el6.dyw.x86_64.rpm
Executing(%clean): /bin/sh -e /var/tmp/rpm-tmp.y1Er5Y
+ umask 022
+ cd /home/dywang/rpmbuild/BUILD
+ cd libgweather-2.28.0
+ rm -rf /home/dywang/rpmbuild/BUILDROOT/libgweather-2.28.0-6.el6.dyw.
    x86_64
+ exit 0
Executing(--clean): /bin/sh -e /var/tmp/rpm-tmp.MSreAY
+ umask 022
+ cd /home/dywang/rpmbuild/BUILD
+ rm -rf libgweather-2.28.0
+ exit 0
```

18.22 docker-engine 套件實例

1. docker-engine 支援 CentOS 6 的版本只到 1.7.1，oraclelinux 提供 docker-engine 更高的版本，但安裝時相依套件 kernel-uek >= 4.1，如果核心版本大於 4.1，不用安裝 kernel-uek 也應該要可以安裝，所以下載 SRPM 套件，重新 build RPM 檔。

```
[dywang@dyw219 ~]$ cd rpmbuild/
[dywang@dyw219 rpmbuild]$ wget https://yum.dockerproject.org/repo/main/
    oraclelinux/6/Packages/docker-engine-17.05.0.ce-1.el6.src.rpm
```

2. 安裝 SRPM 套件

```
[dywang@dyw219 rpmbuild]$ rpm -ivh docker-engine-17.05.0.ce-1.el6.src.
    rpm
   1:docker-engine          ########################################
       [100%]
```

3. 解打包壓縮

```
[dywang@dyw219 rpmbuild]$ cd SOURCES/
[dywang@dyw219 SOURCES]$ tar zxvf docker-engine.tar.gz
```

4. 版本名稱 17.05.0-ce，但版本名稱不允許減號'-'，實際名稱爲 17.05.0.ce。

```
[dywang@dyw219 SOURCES]$ diff -uN ../tmp/docker-engine/VERSION docker-
    engine/VERSION
--- ../tmp/docker-engine/VERSION    2017-05-05 05:36:17.000000000 +0800
+++ docker-engine/VERSION   2019-08-19 10:56:26.627394532 +0800
@@ -1 +1 @@
-17.05.0-ce
+17.05.0.ce
```

5. 重新打包壓縮 docker-engine.tar.gz。

```
[dywang@dyw219 SOURCES]$ tar zcvf docker-engine.tar.gz containerd docker
    -engine proxy runc tini
```

6. 修改 docker-engin.spec 檔，由於版本變數無法取得版本，所以直接在 spec 檔開頭定義，Release 加 dyw，核心要求用 or 增加 kernel 及 kernel-ml，docker 實際安裝的執行檔在 /usr/bin，所以 /usr/local/bin 必須改成 /usr/bin。

```
[dywang@dyw219 SOURCES]$ diff -uN ../tmp/docker-engine.spec ../SPECS/
    docker-engine.spec
--- ../tmp/docker-engine.spec   2017-05-05 06:09:41.000000000 +0800
+++ ../SPECS/docker-engine.spec 2019-08-19 12:01:32.234691761 +0800
@@ -1,6 +1,10 @@
+%define _version 17.05.0.ce
+%define _origversion 17.05.0.ce
+%define _release 1
+
 Name: docker-engine
 Version: %{_version}
-Release: %{_release}%{?dist}
+Release: %{_release}%{?dist}.dyw
 Summary: The open-source application container engine
 Group: Tools/Docker

@@ -57,7 +61,7 @@
 %endif
 %if 0%{?oraclelinux} >= 6
 # Require Oracle Unbreakable Enterprise Kernel R4 and newer device-
     mapper
-Requires: kernel-uek >= 4.1
+Requires: (kernel >=4.1 or kernel-uek >= 4.1 or kernel-ml >= 4.1)
 Requires: device-mapper >= 1.02.90-2
 %endif

@@ -137,18 +141,18 @@
 install -p -m 755 bundles/%{_origversion}/dynbinary-daemon/dockerd-%{
     _origversion} $RPM_BUILD_ROOT/%{_bindir}/dockerd

 # install proxy
-install -p -m 755 /usr/local/bin/docker-proxy $RPM_BUILD_ROOT/%{_bindir
    }/docker-proxy
+install -p -m 755 /usr/bin/docker-proxy $RPM_BUILD_ROOT/%{_bindir}/
    docker-proxy

 # install containerd
-install -p -m 755 /usr/local/bin/docker-containerd $RPM_BUILD_ROOT/%{
    _bindir}/docker-containerd
-install -p -m 755 /usr/local/bin/docker-containerd-shim $RPM_BUILD_ROOT
    /%{_bindir}/docker-containerd-shim
-install -p -m 755 /usr/local/bin/docker-containerd-ctr $RPM_BUILD_ROOT
    /%{_bindir}/docker-containerd-ctr
+install -p -m 755 /usr/bin/docker-containerd $RPM_BUILD_ROOT/%{_bindir
    }/docker-containerd
+install -p -m 755 /usr/bin/docker-containerd-shim $RPM_BUILD_ROOT/%{
    _bindir}/docker-containerd-shim
+install -p -m 755 /usr/bin/docker-containerd-ctr $RPM_BUILD_ROOT/%{
```

```
    _bindir}/docker-containerd-ctr
39
 # install runc
41 -install -p -m 755 /usr/local/bin/docker-runc $RPM_BUILD_ROOT/%{_bindir
    }/docker-runc
   +install -p -m 755 /usr/bin/docker-runc $RPM_BUILD_ROOT/%{_bindir}/
    docker-runc
43
 # install tini
45 -install -p -m 755 /usr/local/bin/docker-init $RPM_BUILD_ROOT/%{_bindir
    }/docker-init
   +install -p -m 755 /usr/bin/docker-init $RPM_BUILD_ROOT/%{_bindir}/
    docker-init
47
 # install udev rules
49 install -d $RPM_BUILD_ROOT/%{_sysconfdir}/udev/rules.d
```

7. 安裝 build docker-engine RPM 需要的套件

```
1 [dywang@dyw219 SOURCES]$ sudo yum install go btrfs-progs \
  btrfs-progs-devel device-mapper-devel
```

8. 重建 docker-engine RPM 及 SRPM 二進位檔，GOPATH 變數不存在，設定 AUTO_GOPATH=1。

```
2 [dywang@dyw219 SOURCES]$ AUTO_GOPATH=1 rpmbuild -ba --clean \
  --target=$(uname -m) ../SPECS/docker-engine.spec
```

18.23 Firefox Crash

1. 在本系統中 Firefox 經常 Crash，更換版本還是無效，最後查得原因爲字型設定問題。預設 Sans-serif 中文字型優先使用 AR PL UMming TW 會造成 crash，尤其簡體字型 gb-xxxxx 編碼，改成 AR PL UMing TW MBE 後網頁不 crash。

```
2 [dywang@dywnb ~]$ grep '<family>Sans-serif' -A9 -B1 .fonts.conf
  <alias>
4         <family>Sans-serif</family>
          <prefer>
6                 <family>DejaVu Sans</family>
                  <family>DejaVu Serif</family>
                  <family>DejaVu Sans Mono</family>
```

```
                <family>AR PL UMing TW MBE</family>
                <family>AR PL UMing TW</family>
                <family>AR PL UMing CN</family>
        </prefer>
</alias>
```

2. 根本解決是刪除 sans-serif 字型的中文使用，不過如此則網頁預設字型爲楷書。

```
[dywang@dywnb ~]$ grep '<family>Sans-serif' -A6 -B1 .fonts.conf
<alias>
        <family>Sans-serif</family>
        <prefer>
                <family>DejaVu Sans</family>
                <family>DejaVu Serif</family>
                <family>DejaVu Sans Mono</family>
        </prefer>
</alias>
```

3. 調整中文字明體先於楷書，結果 firefox 還是常 crash。

```
[root@dywnb ~]# vim /etc/fonts/conf.d/65-nonlatin.conf
```

4. 最後找到原因爲 AR PL UMing TW 字型大於 11 且 16 的字型進行 antialias 導致 firefox 部分網頁 crash。

```
[dywang@dywnb ~]$ diff -uN .fonts.conf.orig .fonts.conf
--- .fonts.conf.orig    2016-06-04 18:57:17.304273658 +0800
+++ .fonts.conf 2016-06-05 06:28:42.796140649 +0800
-<match target="font">
-       <test qual="any" name="family" compare="eq">
-               <string>AR PL UMing TW</string>
-               <string>AR PL UMing CN</string>
-       </test>
-       <test name="pixelsize" compare="more_eq">
-               <double>11</double>
-       </test>
-       <test name="pixelsize" compare="less_eq">
-               <double>16</double>
-       </test>
-       <edit name="antialias" mode="assign">
-               <bool>false</bool>
-       </edit>
-</match>
```

5. hp probook 430 g3 + firefox 經常 crash，xorg-x11-drv 更新到 CentOS 6.8 版後穩定。

```
[root@dywnb Packages]# yum update xorg-x11-drv-* --enablerepo=centos
```

6. Youtube 影片，Hangouts 視訊 Xorg CPU 使用率非常高，關閉 gfx.xrender.enabled 後解決，但 firefox 的 CPU 使用率還是非常高，但螢幕比較不會卡住。

```
about:config
gfx.xrender.enabled flase
```

7. firefox 使用 flash-plugin。

```
[dywang@dywIssd ~]$ firefox
Vector smash protection is enabled.

[root@dywIssd ~]# strings /usr/lib64/flash-plugin/libflashplayer.so |
    grep smash
Vector smash protection is enabled.

about:config
dom.ipc.plugins.flash.disable-protected-mode
```

8. firefox 無法使用 AnonymoX。

```
about:config
xpinstall.signatures.required false
```

18.24 其他

1. 更新套件後 gdm 無法登入圖形界面，但文字界面 shell 可登入。原因爲之前 /etc/gdm/PreSession/Default 加入的 `pkill gcin` 必須刪除。

```
[root@dywhd1 ~]# diff -uN /etc/gdm/PreSession/Default /etc/gdm.old/
    PreSession/Default
--- /etc/gdm/PreSession/Default 2014-10-16 05:23:11.000000000 +0800
+++ /etc/gdm.old/PreSession/Default 2015-04-10 14:17:03.879606569 +0800
@@ -7,3 +7,4 @@
```

```
# Note that output goes into the .xsession-errors file for easy
    debugging
#
PATH="/usr/bin:$PATH"
+pkill gcin
```

2. gcc 更新後，rpmbuild 編譯程式出現以下錯誤，必須更新 binutils binutils-devel 套件。

```
gcc 4.8 Error: expecting string instruction after `rep'
```

Chapter 19

Google TalkPlugin

19.1 前言

1. Google TalkPlugin 改版 5.41，原先 RHEL/CentOS 6 安裝的 Plugin 版本 5.4 無法執行。

2. Google TalkPlugin 改版 5.41 無法直接安裝到 RHEL/CentOS 6。

3. 下載套件

```
[root@dywnb ~]# cd /usr/src
[root@dywnb src]# wget https://dl.google.com/linux/talkplugin/rpm/stable/\
x86_64/google-talkplugin-5.41.0.0-1.x86_64.rpm
```

4. 安裝時出現相依套件版本不符。

```
[root@dywnb src]# yum --nogpgcheck install google-talkplugin_current_x86_64.rpm
Resolving Dependencies
Skipping filters plugin, no data
--> Running transaction check
---> Package google-talkplugin.x86_64 0:5.41.0.0-1 will be installed
--> Processing Dependency: libc.so.6(GLIBC_2.14)(64bit) for package: google-talkplugin-5.41.0.0-1.x86_64
--> Processing Dependency: libstdc++.so.6(GLIBCXX_3.4.15)(64bit) for package: google-talkplugin-5.41.0.0-1.x86_64
--> Finished Dependency Resolution
Error: Package: google-talkplugin-5.41.0.0-1.x86_64 (/google-talkplugin_current_x86_64)
           Requires: libc.so.6(GLIBC_2.14)(64bit)
Error: Package: google-talkplugin-5.41.0.0-1.x86_64 (/google-talkplugin_current_x86_64)
           Requires: libstdc++.so.6(GLIBCXX_3.4.15)(64bit)
```

```
13 You could try using --skip-broken to work around the problem
```

19.2 EL6 Glibc 2.15 套件

1. CentOS 6 適用的 glibc-2.15 已有編譯好的套件，只要將其 repo 設定好就可直接安裝。

```
1 [root@dywnb src]# cat /etc/yum.repos.d/steam.repo
[steam]
3 name=steam
baseurl=http://ftp.vim.org/ftp/pub/ftp/os/Linux/distr/redsleeve/steam/
5 gpgcheck=0
enable=0
```

2. 安裝 glibc-2.15，其他相依套件也會一併更新。

```
[root@dywnb glibc]# yum install glibc-2.15 --enablerepo=steam
```

19.3 EL6 GCC 4.6 套件

1. 必須使用 gcc-4.6 以上套件才能滿足 libstdc++.so.6(GLIBCXX_3.4.15)，但 CentOS 6 目前最高版本爲 gcc-4.4，雖然 steam repo 中已有編譯好的 gcc-4.7 相關的套件，但安裝時 filesystem 必須 >= 3，目前 CentOS 6 的 filesystem 最高版本爲 filesystem-2.4.30，因沒找到 filesystem-3.xxx.el6.x86_64.rpm 套件，所以下載 fedora 16 的 srpm 自行編譯。

```
1 [dywang@dywnb ~]$ cd rpmbuild
[dywang@dywnb rpmbuild]$ wget ftp://ftp.pbone.net/vol4/archive.
    fedoraproject.org/fedora/linux/\
3 releases/16/Everything/source/SRPMS/gcc-4.6.2-1.fc16.src.rpm
[dywang@dywnb rpmbuild]$ wget ftp://ftp.pbone.net/vol4/archive.
    fedoraproject.org/fedora/linux/\
5 releases/16/Everything/source/SRPMS/binutils-2.21.53.0.1-2.fc16.src.rpm
```

2. 安裝 binutils 及 gcc srpm 套件。

```
[dywang@dywnb rpmbuild]$ rpm -ivh binutils-2.21.53.0.1-2.fc16.src.rpm
[dywang@dywnb rpmbuild]$ rpm -ivh gcc-4.6.2-1.fc16.src.rpm
```

3. 重建 binutils rpm 套件。

```
[dywang@dywnb rpmbuild]$ rpmbuild -ba ~/rpmbuild/SPECS/binutils.spec
```

4. 安裝建好的 binutils 相關 rpm 套件。

```
[dywang@dywnb rpmbuild]$ sudo rpm -Uvh ~/rpmbuild/RPMS/x86_64/binutils-*
```

5. 修改 gcc.spec 要求 libmpc-devel 版本必須 >=0.8-3。

```
[dywang@dywnb rpmbuild]$ cp SPECS/gcc.spec SPECS/gcc.spec.orig
[dywang@dywnb rpmbuild]$ vim SPECS/gcc.spec
[dywang@dywnb rpmbuild]$ diff -uN SPECS/gcc.spec.orig SPECS/gcc.spec
--- SPECS/gcc.spec.orig 2011-10-27 19:07:27.000000000 +0800
+++ SPECS/gcc.spec  2016-07-07 16:02:57.189504261 +0800
@@ -296,7 +296,7 @@
 Requires: libquadmath = %{version}-%{release}
 Requires: libquadmath-devel = %{version}-%{release}
 %endif
-BuildRequires: gmp-devel >= 4.1.2-8, mpfr-devel >= 2.2.1, libmpc-devel
    >= 0.8.1
+BuildRequires: gmp-devel >= 4.1.2-8, mpfr-devel >= 2.2.1, libmpc-devel
    >= 0.8-3
 Requires(post): /sbin/install-info
 Requires(preun): /sbin/install-info
 Autoreq: true
@@ -1083,7 +1083,7 @@
 cp -r -p ../libstdc++-v3/doc/html ../rpm.doc/libstdc++-v3/html
 cp -r -p $libstdcxx_doc_builddir/html ../rpm.doc/libstdc++-v3/html/api
 mkdir -p %{buildroot}%{_mandir}/man3
-cp -r -p $libstdcxx_doc_builddir/man/man3/* %{buildroot}%{_mandir}/man3
    /
+#cp -rf -p $libstdcxx_doc_builddir/man/* %{buildroot}%{_mandir}/man3/
 find ../rpm.doc/libstdc++-v3 -name \*~ | xargs rm
 %endif
```

6. 重建 gcc-4.6.2 相關套件，若有相依套件要安裝，必須先裝好，整個編譯過程要花 2 小時以上。

```
[dywang@dywnb rpmbuild]$ rpmbuild -ba ~/rpmbuild/SPECS/gcc.spec
```

7. 編譯完產生以下 gcc 相關 rpm 套件。

```
[dywang@dywnb rpmbuild]$ ls RPMS/x86_64/*4.6.2*.rpm
RPMS/x86_64/cpp-4.6.2-1.el6.x86_64.rpm                  RPMS/x86_64/
    libgnat-4.6.2-1.el6.x86_64.rpm
RPMS/x86_64/gcc-4.6.2-1.el6.x86_64.rpm                  RPMS/x86_64/
    libgnat-devel-4.6.2-1.el6.x86_64.rpm
RPMS/x86_64/gcc-base-debuginfo-4.6.2-1.el6.x86_64.rpm   RPMS/x86_64/
    libgnat-static-4.6.2-1.el6.x86_64.rpm
RPMS/x86_64/gcc-c++-4.6.2-1.el6.x86_64.rpm              RPMS/x86_64/libgo
    -4.6.2-1.el6.x86_64.rpm
RPMS/x86_64/gcc-debuginfo-4.6.2-1.el6.x86_64.rpm        RPMS/x86_64/libgo
    -devel-4.6.2-1.el6.x86_64.rpm
RPMS/x86_64/gcc-gfortran-4.6.2-1.el6.x86_64.rpm         RPMS/x86_64/
    libgomp-4.6.2-1.el6.x86_64.rpm
RPMS/x86_64/gcc-gnat-4.6.2-1.el6.x86_64.rpm             RPMS/x86_64/libgo
    -static-4.6.2-1.el6.x86_64.rpm
RPMS/x86_64/gcc-go-4.6.2-1.el6.x86_64.rpm               RPMS/x86_64/
    libmudflap-4.6.2-1.el6.x86_64.rpm
RPMS/x86_64/gcc-java-4.6.2-1.el6.x86_64.rpm             RPMS/x86_64/
    libmudflap-devel-4.6.2-1.el6.x86_64.rpm
RPMS/x86_64/gcc-objc-4.6.2-1.el6.x86_64.rpm             RPMS/x86_64/
    libmudflap-static-4.6.2-1.el6.x86_64.rpm
RPMS/x86_64/gcc-objc++-4.6.2-1.el6.x86_64.rpm           RPMS/x86_64/
    libobjc-4.6.2-1.el6.x86_64.rpm
RPMS/x86_64/gcc-plugin-devel-4.6.2-1.el6.x86_64.rpm     RPMS/x86_64/
    libquadmath-4.6.2-1.el6.x86_64.rpm
RPMS/x86_64/libgcc-4.6.2-1.el6.x86_64.rpm               RPMS/x86_64/
    libquadmath-devel-4.6.2-1.el6.x86_64.rpm
RPMS/x86_64/libgcj-4.6.2-1.el6.x86_64.rpm               RPMS/x86_64/
    libquadmath-static-4.6.2-1.el6.x86_64.rpm
RPMS/x86_64/libgcj-devel-4.6.2-1.el6.x86_64.rpm         RPMS/x86_64/
    libstdc++-4.6.2-1.el6.x86_64.rpm
RPMS/x86_64/libgcj-src-4.6.2-1.el6.x86_64.rpm           RPMS/x86_64/
    libstdc++-devel-4.6.2-1.el6.x86_64.rpm
RPMS/x86_64/libgfortran-4.6.2-1.el6.x86_64.rpm          RPMS/x86_64/
    libstdc++-docs-4.6.2-1.el6.x86_64.rpm
RPMS/x86_64/libgfortran-static-4.6.2-1.el6.x86_64.rpm   RPMS/x86_64/
    libstdc++-static-4.6.2-1.el6.x86_64.rpm
```

19.4 自建 repo

1. 由於 glibc 及 gcc 升級版本相關套件很多，所以自行建立 repodata，以方便安裝。將新版的 glibc 及 gcc 相關套件，複製到新建的目錄 glibc 中。

```
[root@dywnb ~]# mkdir /var/ftp/pub/glibc
[root@dywnb ~]# cd /var/ftp/pub/glibc/
[root@dywnb glibc]# cp -a /var/cache/yum/x86_64/6/steam/packages/* .
[root@dywnb glibc]# cp -a /home/dywang/rpmbuild/RPMS/x86_64/*4.6.2*.rpm
    .
```

2. 將 glibc 中的 rpm 套件建立 repo 資料庫

```
[root@dywnb glibc]# createrepo --simple-md-filenames --update .
```

3. 將 glibc 中的 rpm 套件建立 repo 資料庫。

```
[root@dywnb ~]# vim /etc/yum.repos.d/glibc.repo
[root@dywnb ~]# cat /etc/yum.repos.d/glibc.repo
[glibc]
name=glibc
baseurl=file:///var/ftp/pub/glibc
gpgcheck=0
```

4. 使用 yum 安裝 gcc-4.6.2 相關套件。

```
[root@dywnb ~]# yum install gcc-4.6.2 --enablerepo=glibc
```

5. 網路上已經有針對 CentOS 6 編譯的 Glibc-2.17 及 gcc-4.8，只要將其 repo 設定好就可以使用了。

```
[myrepo-el6]
name=myrepo-el6
baseurl=http://copr-be.cloud.fedoraproject.org/results/mosquito/myrepo-
    el6/
gpgcheck=1
gpgkey=http://copr-be.cloud.fedoraproject.org/results/mosquito/myrepo-
    el6/pubkey.gpg
enabled=0
```

Chapter 20

安裝兩版本 firefox

20.1 緣由

1. RHEL/CentOS 6 rpm 的 firefox 版本 52 使用 gtk2，一切正常。
2. Google Hangout 更新後，firefox 52 無法使用 hangouts 的視訊。
3. RHEL/CentOS 6 目前最新的 firefox rpm 版本是 68，自帶 gtk3 函式庫，hangouts 視訊正常。
4. 由於 firefox 68 預設使用 gtk3，而 RHEL/CentOS 6 的 gcin 或 ibus 只有 gtk2 模組，因此無法正常工作，即使調整環境變數到可以輸入中文，也因 firefox 無法回傳輸入框座標，選字框都固定在左上 (下) 角。
5. 本章嘗試在 RHEL/CentOS 6 同時安裝 52 及 68 兩個不同版本的 firefox。

20.2 tar.bz2 下載安裝

1. yum 安裝了 firefox 52

```
[root@dywmsi ~]# rpm -qa | grep firefox
firefox-52.6.0-1.el6.dyw.x86_64
```

2. 從 firefox 各種版本的下載位址，下載 firefox 68。

```
[root@dywmsi ~]# cd /usr/local/
[root@dywmsi local]# wget https://ftp.mozilla.org/pub/firefox/releases/\
68.2.0esr/linux-x86_64/en-US/firefox-68.2.0esr.tar.bz2
```

3. 解打包解壓縮 firefox 68

```
[root@dywmsi local]# tar jxvf firefox-68.2.0esr.tar.bz2
```

4. 以一般用户 dywang 執行 firefox-bin，出現沒有 libgtk-3.so.0 函式，RHEL/CentOS 6 使用 gtk2，本就沒有 gtk3 函式。

```
[dywang@dywmsi ~]$ /usr/local/firefox/firefox-bin
XPCOMGlueLoad error for file /usr/local/firefox/libmozgtk.so:
libgtk-3.so.0: cannot open shared object file: No such file or directory
Couldn't load XPCOM.
```

20.3 取得 gtk3 函式庫

1. 下載 CentOS 6.10 打包好的 firefox 68 rpm 檔。

```
[root@dywmsi ~]# cd /usr/src/
[root@dywmsi src]# wget ftp://ftp.pbone.net/mirror/ftp.centos.org/6.10/\
updates/x86_64/Packages/firefox-68.2.0-4.el6.centos.x86_64.rpm
```

2. 建立暫存工作目錄 tmp，並進入 tmp 目錄。

```
[root@dywmsi src]# mkdir tmp
[root@dywmsi src]# cd tmp
```

3. 不安裝 firefox 68 rpm 下，解開 rpm 檔。

```
[root@dywmsi tmp]# rpm2cpio ../firefox-68.2.0-4.el6.centos.x86_64.rpm |
    cpio -idvm
```

4. Firefox 68 自帶的 gtk3 函式如下：

```
[root@dywmsi tmp]# ls usr/lib64/firefox/bundled/lib64/
cairo                          libgio-2.0.so.0.5400.2
gdk-pixbuf-2.0                 libglib-2.0.so.0
gio                            libglib-2.0.so.0.5400.2
gtk-3.0                        libgmodule-2.0.so.0
libatk-1.0.so.0                libgmodule-2.0.so.0.5400.2
```

```
libatk-1.0.so.0.22209.1          libgobject-2.0.so.0
libatk-bridge-2.0.so.0           libgobject-2.0.so.0.5400.2
libatk-bridge-2.0.so.0.0.0       libgthread-2.0.so.0
libatspi.so.0                    libgthread-2.0.so.0.5400.2
libatspi.so.0.0.1                libgtk-3.so.0
libcairo-gobject.so.2            libgtk-3.so.0.2200.26
libcairo-gobject.so.2.11400.8    libharfbuzz.so.0
libcairo.so.2                    libharfbuzz.so.0.10302.0
libcairo.so.2.11400.8            libpango-1.0.so.0
libfontconfig.so.1               libpango-1.0.so.0.4000.4
libfontconfig.so.1.7.0           libpangocairo-1.0.so.0
libfreetype.so.6                 libpangocairo-1.0.so.0.4000.4
libfreetype.so.6.10.0            libpangoft2-1.0.so.0
libgdk-3.so.0                    libpangoft2-1.0.so.0.4000.4
libgdk-3.so.0.2200.26            libpcre.so.1
libgdk_pixbuf-2.0.so.0           libpcre.so.1.2.0
libgdk_pixbuf-2.0.so.0.3600.5    librsvg-2.so.2
libgio-2.0.so.0                  librsvg-2.so.2.40.16
```

5. 把 firefox 68 自帶的 gtk3 函式庫，複製到 /usr/local 目錄。

```
[root@dywmsi tmp]# cp -a usr/lib64/firefox/bundled/lib64 /usr/local/
```

20.4 建立執行腳本

1. 如果已新增 profile ff68，腳本使用 ff68 profile 開啓 firefox 68。

```
[dywang@dywmsi ~]$ cat /home/dywang/bin/firefox68
#!/bin/bash
export GTK_IM_MODULE=gcin
export GTK3_IM_MODULE=gcin
export QT_IM_MODULE=gcin
export LC_CTYPE=zh_TW.UTF-8
export XMODIFIERS="@im=gcin"

export LD_LIBRARY_PATH=/usr/local/lib64/:$LD_LIBRARY_PATH
export FONTCONFIG_PATH=/etc/fonts
/usr/local/firefox/firefox-bin $@ --no-remote --new-instance -P ff68
Mozilla Firefox 68.2.0esr
```

20.5 抽取 rpm 檔案

1. 下載 CentOS 6.10 打包好的 firefox 68 rpm 檔。

```
[root@dywmsi ~]# cd /usr/src/
[root@dywmsi src]# wget ftp://ftp.pbone.net/mirror/ftp.centos.org/6.10/\
updates/x86_64/Packages/firefox-68.2.0-4.el6.centos.x86_64.rpm
```

2. 進入 /usr/local 建立安裝目錄 firefox68，並進入 tmp 目錄。

```
[root@dywmsi src]# cd /usr/local/
[root@dywmsi local]# mkdir firefox68
[root@dywmsi local]# cd firefox68/
```

3. 不安裝 firefox 68 rpm 下，解開 rpm 檔。

```
[root@dywmsi firefox68]# rpm2cpio /usr/src/firefox-68.2.0-4.el6_10.
    x86_64.rpm \
| cpio -idvm
```

4. 修改 Firefox 68 執行腳本，增加 LD_LIBRARY_PATH 到自帶的 gtk3 函式庫目錄，MOZ_LIB_DIR 變數改爲"/usr/local/firefox68/usr/lib64"。

```
[root@dywmsi firefox68]# grep firefox68 usr/bin/firefox
export LD_LIBRARY_PATH=/usr/local/firefox68/usr/lib64/firefox/bundled/
    lib64/\
:$LD_LIBRARY_PATH
        MOZ_LIB_DIR="/usr/local/firefox68/usr/lib64"
```

5. 切換目錄到 /usr/lib64/firefox/bundled，建立 lin64 目錄連結到 /usr/local/firefox68/usr/lib64/firefox/bundled/lib64。

```
[root@dywmsi firefox68]# cd /usr/lib64/firefox/bundled
[root@dywmsi bundled]# ln -s /usr/local/firefox68\
/usr/lib64/firefox/bundled/lib64 lib64
```

6. 切換目錄到 /usr/local/bin，將修改好的 firefox 68 執行腳本 firefox，連結爲 firefox68。

```
[root@dywmsi bundled]# cd /usr/local/bin/
[root@dywmsi bin]# ln -s ../firefox68/usr/bin/firefox firefox68
```

7. 開啓 firefox68”。

```
[dywang@dywmsi ~]$ LC_CTYPE=zh_TW.UTF-8 GTK_IM_MODULE=gcin firefox68 -P
   ff68
```

Chapter 21

firefox 68 el6

21.1 緣由

1. RHEL/CentOS 6 目前最新的 firefox rpm 版本是 68，自帶 gtk3 函式庫，hangouts 視訊正常。
2. 由於 firefox 68 預設使用 gtk3，而 RHEL/CentOS 6 的 gcin 或 ibus 只有 gtk2 模組，因此無法正常工作，即使調整環境變數到可以輸入中文，也因 firefox 無法回傳輸入框座標，選字框都固定在左上 (下) 角。
3. 本章目的爲解決在 RHEL/CentOS 6，firefox 68 因使用自帶 gtk 3.0 函式產生的問題。
4. 解決 firefox 68 使用 gcin 的問題。
5. 調整 gsetting 設定無法存檔問題。

21.2 安裝 firefox 68 rpm

1. rpm 安裝 firefox 68。

```
[root@dywmsi ~]# rpm -ivh ftp://ftp.pbone.net/mirror/ftp.centos.org
    /6.10/\
updates/x86_64/Packages/firefox-68.2.0-4.el6.centos.x86_64.rpm
```

2. firefox 68 自帶的 gtk 3.0 目錄。

```
[root@dywmsi ~]# cd /usr/lib64/firefox/bundled/
[root@dywmsi bundled]# ll
total 24
```

```
4 drwxr-xr-x.  2 root root 4096 Dec 20 08:59 bin
  drwxr-xr-x.  4 root root 4096 Nov 23 14:02 etc
6 drwxr-xr-x.  6 root root 4096 Dec 20 09:00 lib64
  drwxr-xr-x.  2 root root 4096 Nov 23 14:13 libexec
8 drwxr-xr-x. 12 root root 4096 Nov 23 14:02 share
  drwxr-xr-x.  3 root root 4096 Nov 23 14:02 var
```

21.3 中文輸入除錯

1. gtk-3.0 的輸入法 module cache 檔 immodules.cache 不存在，這個檔由執行 gtk-query-immodules-3.0-64 產生，必須安裝 gtk3 才有。

```
1 [dywang@dywmsi ~]$ GTK_IM_MODULE=gcin strace firefox68 -P ff68 2>&1 |
     grep immodules
  open("/usr/lib64/firefox/bundled/lib64/gtk-3.0/3.0.0/immodules.cache",
     O_RDONLY)
3  = -1 ENOENT (No such file or directory)
```

2. RHEL/CentOS 6 使用 gtk2，只有 gtk-query-immodules-2.0-64，用這個檔產生 immodules.cache。

```
1 [root@dywmsi ~]# cd /usr/lib64/firefox/bundled/lib64/gtk-3.0/3.0.0/
  [root@dywmsi 3.0.0]# gtk-query-immodules-2.0-64 | tee immodules.cache
3 # GTK+ Input Method Modules file
  # Automatically generated file, do not edit
5 # Created by gtk-query-immodules-2.0-64 from gtk+-2.24.23
  #
7 # ModulesPath = /root/.gtk-2.0/2.10.0/x86_64-redhat-linux-gnu/immodules:
  /root/.gtk-2.0/2.10.0/immodules:/root/.gtk-2.0/x86_64-redhat-linux-gnu/
     immodules:
9 /root/.gtk-2.0/immodules:/usr/lib64/gtk-2.0/2.10.0/x86_64-redhat-linux-
     gnu/immodules:
  /usr/lib64/gtk-2.0/2.10.0/immodules:/usr/lib64/gtk-2.0/x86_64-redhat-
     linux-gnu/immodules:
11 /usr/lib64/gtk-2.0/immodules
  #
13 "/usr/lib64/gtk-2.0/2.10.0/immodules/im-xim.so"
  "xim" "X Input Method" "gtk20" "/usr/share/locale" "ko:ja:th:zh"
15
  "/usr/lib64/gtk-2.0/immodules/im-gcin.so"
17 "gcin" "gcin Input Method" "gcin" "/usr/share/locale" "zh:ja"
```

3. 再執行 firefox，已可讀取輸入法模組函式 im-gcin.so，但 firefox Segmentation fault (core dumped) 無法正常運作。

```
[dywang@dywmsi ~]$ GTK_IM_MODULE=gcin strace firefox68 -P ff68 2>&1 |
    grep immodules
open("/usr/lib64/firefox/bundled/lib64/gtk-3.0/3.0.0/immodules.cache",
    O_RDONLY) = 60
stat("/usr/lib64/gtk-2.0/immodules/im-gcin.so", {st_mode=S_IFREG|0755,
    st_size=13672, ...}) = 0
open("/usr/lib64/gtk-2.0/immodules/im-gcin.so", O_RDONLY|O_CLOEXEC) = 60
```

4. firefox 68 預設使用 gtk3，必須有 gtk3 的 im-gcin.so 才能運作。找到 Megeia 2 有 gcin-gtk3-2.7.5-2.mga2.x86_64.rpm，不管相依套件強制安裝。

```
[root@dywmsi 3.0.0]# rpm -ivh --nodeps ftp://ftp.pbone.net/mirror/\
distrib-coffee.ipsl.jussieu.fr/mageia/distrib/2/x86_64/media/core/\
release/gcin-gtk3-2.7.5-2.mga2.x86_64.rpm
```

5. gcin-gtk3 只有 im-gcin.so 一個檔案。

```
[root@dywmsi 3.0.0]# rpm -ql gcin-gtk3
/usr/lib64/gtk-3.0/immodules/im-gcin.so
```

6. 修改 immodules.cache，將 im-gcin.so 位置改到 gcin-gtk3 安裝的檔案。

```
[root@dywmsi 3.0.0]# vim immodules.cache
[root@dywmsi 3.0.0]# grep 3.0 immodules.cache
"/usr/lib64/gtk-3.0/immodules/im-gcin.so"
```

7. 再執行 firefox 68，一切正常，不但中文輸入沒問題，而且之前直接安裝 firefox-68 rpm 時，可以輸入中文，但選字字框一直固定在左上角的問題也解決了。

```
[dywang@dywmsi ~]$ GTK_IM_MODULE=gcin strace firefox68 -P ff68 2>&1 |
    grep immodules
open("/usr/lib64/firefox/bundled/lib64/gtk-3.0/3.0.0/immodules.cache",
    O_RDONLY) = 57
stat("/usr/lib64/gtk-3.0/immodules/im-gcin.so", {st_mode=S_IFREG|0755,
    st_size=14688, ...}) = 0
open("/usr/lib64/gtk-3.0/immodules/im-gcin.so", O_RDONLY|O_CLOEXEC) = 57
```

21.4 GSettings 預設值

1. 在 RHEL/CentOS 6 中使用 firefox 68，預設使用 gtk 2，開啓 file chooser 時，gtk-3.0 的設定無法使用，所以設定都無法存檔，每次都只能使用預設值。

```
[dywang@dywmsi ~]$ firefox -P vnc
GLib-GIO-Message: Using the 'memory' GSettings backend.  Your settings
    will
not be saved or shared with other applications.
```

2. 進到 firefox 68 的 glib-2.0/schemas 目錄，其中有 Fine Chooser 的設定檔 org.gtk.Settings.FileChooser.gschema.xml。

```
[root@dywmsi ~]# cd /usr/lib64/firefox/bundled/share/glib-2.0/schemas/
[root@dywmsi schemas]# ll
total 36
-rw-r--r--. 1 root root 2839 Nov  1 08:14 gschema.dtd
-rw-r--r--. 1 root root 2940 Dec 20 16:06 gschemas.compiled
-rw-r--r--. 1 root root  618 Dec 20 15:27 org.gtk.Demo.gschema.xml
-rw-r--r--. 1 root root  845 Nov  1 08:14 org.gtk.exampleapp.gschema.xml
-rw-r--r--. 1 root root  931 Nov  1 08:14 org.gtk.Settings.ColorChooser.
    gschema.xml
-rw-r--r--. 1 root root  833 Nov  1 08:14 org.gtk.Settings.Debug.gschema
    .xml
-rw-r--r--. 1 root root  623 Nov  1 08:14 org.gtk.Settings.EmojiChooser.
    gschema.xml
-rw-r--r--. 1 root root 5359 Dec 20 16:08 org.gtk.Settings.FileChooser.
    gschema.xml
```

3. 修改 sort-directories-first (目錄先排)，sort-column 以 modified 檔案修改時間排序，sort-order descending 遞減排序，window-size 設定視窗預設大小。

```
[root@dywmsi schemas]# vim org.gtk.Settings.FileChooser.gschema.xml
[root@dywmsi schemas]# egrep "(sort-(column|order|directories-first)|
    window-size)" \
-A1 org.gtk.Settings.FileChooser.gschema.xml
    <key type="b" name="sort-directories-first">
      <default>true</default>
--
    <key name='sort-column' enum='org.gtk.Settings.FileChooser.
        SortColumn'>
      <default>'modified'</default>
--
    <key name='sort-order' enum='org.gtk.Settings.FileChooser.SortOrder'
        >
```

```
11      <default>'descending'</default>
--
13    <key name='window-size' type='(ii)'>
        <default>(800, 600)</default>
```

4. 修改 xml 檔後執行 glib-compile-schmas，對目前工作目錄的 xml 檔編譯，產生 gschemas.compiled。執行結果除 window-size 無效，其他設定皆生效。

```
[root@dywmsi schemas]# glib-compile-schemas .
2 [root@dywmsi schemas]# ll gschema
gschema.dtd        gschemas.compiled
4 [root@dywmsi schemas]# ll gschemas.compiled
-rw-r--r--. 1 root root 2940 Dec 20 16:45 gschemas.compiled
```

21.5 取得 GSettings 執行檔

1. 在 RHEL/CentOS 6 中使用 firefox 68，出現 GSettings 後端使用記憶體，無法存檔，所以每次在 firefox 開檔存檔的 FileChooser 視窗設定都會回到預設值。

```
1 [dywang@deyu ~]$ firefox
GLib-GIO-Message: Using the 'memory' GSettings backend.
3 Your settings will not be saved or shared with other applications.
```

2. 從 CentOS 7 (192.168.122.7) 複製 gsettings 執行檔到 /usr/lib64/firefox/bundled/bin。

```
1 [root@deyu ~]# cd /usr/lib64/firefox/bundled/bin
[root@deyu bin]# scp 192.168.122.7:/usr/bin/gsettings .
3 gsettings                                     100%   24KB  23.8KB/s
   00:00
```

3. 從 CentOS 7 (192.168.122.7) 複製 gsettings 執行檔到 /usr/lib64/firefox/bundled/bin，沒有 libffi.so.6 函式庫。

```
1 [root@deyu bin]# LD_LIBRARY_PATH=/usr/lib64/firefox/bundled/lib64 ./
   gsettings
```

```
./gsettings: error while loading shared libraries: libffi.so.6: cannot
    open
shared object file: No such file or directory
```

4. 從 CentOS 7 (192.168.122.7) 同步 libffi.so.6 函式庫到 /usr/lib64/firefox/bundled/lib64。

```
[root@deyu bin]# rsync -av 192.168.122.7:/usr/lib64/libffi.so.6* \
/usr/lib64/firefox/bundled/lib64/
receiving incremental file list
libffi.so.6 -> libffi.so.6.0.1
libffi.so.6.0.1

sent 49 bytes  received 32432 bytes  21654.00 bytes/sec
total size is 32319  speedup is 1.00
```

5. 可以使用 gsettings 命令了。

```
[root@deyu bin]# LD_LIBRARY_PATH=/usr/lib64/firefox/bundled/lib64 ./
    gsettings Usage:
  gsettings --version
  gsettings [--schemadir SCHEMADIR] COMMAND [ARGS…]

Commands:
  help                      Show this information
  list-schemas              List installed schemas
  list-relocatable-schemas  List relocatable schemas
  list-keys                 List keys in a schema
  list-children             List children of a schema
  list-recursively          List keys and values, recursively
  range                     Queries the range of a key
  describe                  Queries the description of a key
  get                       Get the value of a key
  set                       Set the value of a key
  reset                     Reset the value of a key
  reset-recursively         Reset all values in a given schema
  writable                  Check if a key is writable
  monitor                   Watch for changes

Use "gsettings help COMMAND" to get detailed help.
```

21.6 GSettings 命令取參數

1. 設定 firefox bundled 的環境變數。

```
[dywang@deyu ~]$ vim bundled
[dywang@deyu ~]$ cat bundled
export GIO_EXTRA_MODULES=/usr/lib64/firefox/bundled/lib64/gio/modules/
export GSETTINGS_SCHEMA_DIR=/usr/lib64/firefox/bundled/share/glib-2.0/
    schemas/
export LD_LIBRARY_PATH=/usr/lib64/firefox/bundled/lib64/
PATH=$PATH:/usr/lib64/firefox/bundled/bin/
```

2. 使用 firefox bundled 的環境變數。

```
[dywang@deyu ~]$ source bundled
[dywang@deyu ~]$ echo $GIO_EXTRA_MODULES
/usr/lib64/firefox/bundled/lib64/gio/modules/
```

3. 從 CentOS 7 (192.168.122.7) 同步 libdconfsettings.so 模組到 /usr/lib64/firefox/bundled/lib64/gio/modules。

```
[root@deyu modules]# rsync -av 192.168.122.7:/usr/lib64/gio/modules/\
libdconfsettings.so /usr/lib64/firefox/bundled/lib64/gio/modules/
receiving incremental file list
libdconfsettings.so

sent 42 bytes  received 54959 bytes  110002.00 bytes/sec
total size is 54856  speedup is 1.00
```

4. 測試 gsettings 取得 org.gtk.Settings.FileChooser 的 window-size，回應沒有安裝 schemas。

```
[dywang@deyu ~]$ gsettings get org.gtk.Settings.FileChooser window-size
No schemas installed
```

5. 測試 gsettings 時指定 GSETTINGS_SCHEMA_DIR 目錄，成功取得 org.gtk.Settings.FileChooser 的 window-size。

```
[dywang@deyu ~]$ GSETTINGS_SCHEMA_DIR=/usr/lib64/firefox/bundled/share/\
glib-2.0/schemas/ gsettings get org.gtk.Settings.FileChooser window-size
(-1, -1)
```

21.7 dconf 執行檔

1. 測試 gsettings 設定 org.gtk.Settings.FileChooser 的 window-size，回應 dconf 錯誤。

```
[dywang@deyu ~]$ GSETTINGS_SCHEMA_DIR=/usr/lib64/firefox/bundled/share/
    glib-2.0\
/schemas/ gsettings set org.gtk.Settings.FileChooser window-size "
    (800,600)"

(process:31050): dconf-WARNING **: failed to commit changes to dconf:
GDBus.Error:org.freedesktop.DBus.Error.ServiceUnknown: The name
ca.desrt.dconf was not provided by any .service files
```

2. 複製 CentOS 7 的 dconf 執行檔到 /usr/lib64/firefox/bundled/bin/。

```
[root@deyu modules]# scp -p 192.168.122.7:/usr/bin/dconf /usr/lib64/
    firefox/bundled/bin/
dconf                                         100%   49KB  48.9KB/s
    00:00
```

3. 執行 dconf，缺少 libdconf.so.1 函式庫。

```
[dywang@deyu ~]$ dconf
dconf: error while loading shared libraries: libdconf.so.1:
cannot open shared object file: No such file or directory
```

4. 從 CentOS 7 (192.168.122.7) 同步 libdconf.so.1 模組到 /usr/lib64/firefox/bundled/lib64/。

```
[root@deyu modules]# rsync -av 192.168.122.7:/usr/lib64/libdconf.so.1* \
/usr/lib64/firefox/bundled/lib64/
receiving incremental file list
libdconf.so.1 -> libdconf.so.1.0.0
libdconf.so.1.0.0

sent 49 bytes  received 59024 bytes  39382.00 bytes/sec
total size is 58905  speedup is 1.00
```

5. 可以執行 dconf 了。

```
[dywang@deyu ~]$ dconf
error: no command specified

Usage:
  dconf COMMAND [ARGS...]

Commands:
  help              Show this information
  read              Read the value of a key
  list              List the contents of a dir
  write             Change the value of a key
  reset             Reset the value of a key or dir
  compile           Compile a binary database from keyfiles
  update            Update the system databases
  watch             Watch a path for changes
  dump              Dump an entire subpath to stdout
  load              Populate a subpath from stdin

Use 'dconf help COMMAND' to get detailed help.
```

21.8 ca.desrt.dconf

1. 測試 gsettings 設定 org.gtk.Settings.FileChooser 的 window-size，回應 ca.desrt.dconf 沒有提供任何服務。

```
[dywang@deyu ~]$ GSETTINGS_SCHEMA_DIR=/usr/lib64/firefox/bundled/share/
    glib-2.0/\
schemas/ gsettings set org.gtk.Settings.FileChooser window-size "
    (800,600)"

(process:31471): dconf-WARNING **: failed to commit changes to dconf:
GDBus.Error:org.freedesktop.DBus.Error.ServiceUnknown:
The name ca.desrt.dconf was not provided by any .service files
```

2. 從 CentOS 7 (192.168.122.7) 複製 ca.desrt.dconf.service 服務設定檔到 bundled 相對的目錄，但因 firefox 預設還是到 /usr/share/dbus-1/services 目錄找服務設定檔，所以建立連結檔。

```
[root@deyu modules]# mkdir -p /usr/lib64/firefox/bundled/share/dbus-1/
    services/
[root@deyu modules]# scp -p 192.168.122.7:/usr/share/dbus-1/services/\
ca.desrt.dconf.service /usr/lib64/firefox/bundled/share/dbus-1/services/
ca.desrt.dconf.service                        100%   68     0.1KB/s
    00:00
```

```
[root@deyu modules]# ln -s /usr/lib64/firefox/bundled/share/dbus-1/
    services/\
ca.desrt.dconf.service /usr/share/dbus-1/services/ca.desrt.dconf.service
```

3. 從 CentOS 7 (192.168.122.7) 複製 ca.desrt.dconf.service 服務憑定的執行檔 dconf-service 到 bundled 相對的目錄。並修改 ca.desrt.dconf 設定。

```
[root@deyu modules]# scp -p 192.168.122.7:/usr/libexec/dconf-service /
    usr/lib64/firefox/bundled/libexec/
dconf-service                                 100%   83KB  83.0KB/s
    00:00
[root@deyu modules]# vim /usr/share/dbus-1/services/ca.desrt.dconf.
    service
[root@deyu modules]# cat /usr/share/dbus-1/services/ca.desrt.dconf.
    service
[D-BUS Service]
Name=ca.desrt.dconf
Exec=/usr/lib64/firefox/bundled/libexec/dconf-service
```

4. 但執行 gsetting 設定時 dconf timeout。

```
[dywang@deyu ~]$ GSETTINGS_SCHEMA_DIR=/usr/lib64/firefox/bundled/share/
    glib-2.0\
/schemas/ gsettings set org.gtk.Settings.FileChooser window-size "
    (800,600)"
(process:12623): dconf-WARNING **: failed to commit changes to dconf:
    Timeout was reached
```

5. 原因爲 dconf-service 執行時取用 RHEL/CentOS 6 的 /usr/lib64 函式庫，必須將環境變數 LD_LIRARY_PATH 改爲 /usr/lib64/firefox/bundled/lib64。將 ca.desrt.dconf 服務改執行腳本 dconf-service.sh。

```
[root@deyu ~]# cat /usr/share/dbus-1/services/ca.desrt.dconf.service
[D-BUS Service]
Name=ca.desrt.dconf
Exec=/usr/lib64/firefox/bundled/bin/dconf-service.sh
```

6. 建立 dconf-service.sh 腳本，執行 dconf-service 時環境變數 LD_LIRARY_PATH 設定爲 /usr/lib64/firefox/bundled/lib64。將 ca.desrt.dconf 服務改執行腳本。

```
[root@deyu ~]# vim /usr/lib64/firefox/bundled/bin/dconf-service.sh
[root@deyu ~]# cat /usr/lib64/firefox/bundled/bin/dconf-service.sh
#!/bin/bash
LD_LIBRARY_PATH=/usr/lib64/firefox/bundled/lib64/ /usr/lib64/firefox/
    bundled/libexec/dconf-service
exit 0
```

7. dconf-service.sh 設定爲可執行。

```
[root@deyu ~]# chmod +x /usr/lib64/firefox/bundled/bin/dconf-service.sh
```

8. gsetting 設定正常。

```
[dywang@deyu ~]$ GSETTINGS_SCHEMA_DIR=/usr/lib64/firefox/bundled/share/
    glib-2.0\
/schemas/ gsettings set org.gtk.Settings.FileChooser window-size "
    (800,600)"
[dywang@deyu ~]$ GSETTINGS_SCHEMA_DIR=/usr/lib64/firefox/bundled/share/
    glib-2.0\
/schemas/ gsettings get org.gtk.Settings.FileChooser window-size
(800, 600)
[dywang@deyu ~]$ GSETTINGS_SCHEMA_DIR=/usr/lib64/firefox/bundled/share/
    glib-2.0\
/schemas/ gsettings set org.gtk.Settings.FileChooser window-size "
    (700,600)"
[dywang@deyu ~]$ GSETTINGS_SCHEMA_DIR=/usr/lib64/firefox/bundled/share/
    glib-2.0\
/schemas/ gsettings get org.gtk.Settings.FileChooser window-size
(700, 600)
```

9. 開啓 firefox，使用開檔功能時，設定選檔視窗後，在家目錄的.config 目錄下會新增 dconf 目錄，並將設定存入目錄下的 user 設定檔。

```
[dywang@deyu ~]$ ll .config/dconf/user
-rw-rw-r--. 1 dywang dywang 787 Dec 21 17:50 .config/dconf/user
```

Chapter 22

Rpmrebuild 不編譯重新打包 rpm

22.1 緣由

1. 由 src rpm 重新編譯 rpm，必須有相依套件及打包編譯環境，若只修改套件部分內容，可從現已安裝或下載的 rpm 修改，再使用 rpmrebuild 命令重新打包。

2. rpmrebuild 命令，提供編輯 rpm spec 檔的功能，修改 spec 後會產生新的 rpm 檔。

22.2 安裝 rpmrebuild

1. rpmrebuild 由 epel-releases 套件庫提供。

```
[root@dyw219 ~]# yum install rpmrebuild
```

2. rpmrebuild 輔助說明，-p 是指定要編輯的 package，-e 是編輯 spec。

```
[root@dyw219 src]# rpmrebuild --help
rpmrebuild is a tool to rebuild an rpm file from the rpm database
Usage: rpmrebuild [options] package
options:
   -5  --md5-compat-digest      use rpm 4.4 compatible digest (md5)
   -a, --additional=<flags> additional flags to be pass to the rpmbuild
   -b, --batch          batch mode (ask no questions)
   -c, --comment-missing=<y|n>  comment missing files in the specfile.
       default : no.
   -d, --directory=<dir>        specify the working directory
   -D, --define=<define>        defines to be passed to the rpmbuild
   -e, --edit-spec              alias for --edit-whole
   -f, --filter=<command>       alias for --change-spec-whole
```

```
  -i, --includes=<file>        read options from the file <file>
  -I, --install                install the created rpm
  -k, --keep-perm              alias for --pug-from-fs
      --pug-from-fs            keep installed files permission, uid and
          gid
      --pug-from-db (default)  use files permission, uid and gid from
          rpm db
      --cap-from-fs            use files posix capabilities from
          installed files
      --cap-from-db (default)  use files posix capabilities from rpm
          database
  -l, --list-plugin        list installed plugins
  -m, --modify=<command>       alias for --change-files
  -n, --notest-install     do not perform a test install
  -p, --package                use package file, not installed rpm
  -P, --autoprovide            force rpm to auto generate "Provide:"
  -r, --release=N              force release to N
  -R, --autorequire            force rpm to auto generate "Require:"
  -s, --spec-only=<specfile>   generate specfile only. (If <specfile> "
      -" stdout will be used)
  -v, --verbose                verbose
      --debug                  debug mode (do not remove temporary
          working files)
  -V, --version                print rpmrebuild version
  -w, --warning                print warning if detect filenames with
      globbing characters (default : no).
  -y, --verify=<y|n>           verify package (rpm -V) before
      processing (default : yes).
  -h, --help                   print this help
      --help-plugins           print help about plugins options

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    >)
this program is distributed under GNU General Public License
```

22.3 使用 rpm 檔實例

1. rpmrebuild -ep 編輯 gcin-gtk3.rpm 的 spec，進入 vi 模式，存檔退出後，回答 y 就可依照編輯的 spec 重新產生 rpm。

```
[root@dyw219 src]# rpmrebuild -ep gcin-gtk3-2.7.4-1.3.dyw.x86_64.rpm
.....
Do you want to continue ? (y/N) y
warning: gcin-gtk3-2.7.5-2.mga2.x86_64.rpm: Header V3 RSA/SHA1 Signature
    , key ID 80420f66: NOKEY
result: /root/rpmbuild/RPMS/x86_64/gcin-gtk3-2.7.4-1.3.dyw.x86_64.rpm
```

2. rpmrebuild -ep 編輯 lib64canberra0.rpm 的 spec，進入 vi 模式，存檔退出後，回答 y 就可依照編輯的 spec 重新產生 rpm。

```
[root@dyw219 src]# rpmrebuild -ep lib64canberra0-0.30-2.mga3.x86_64.rpm
.....
Do you want to continue ? (y/N) y
warning: lib64canberra0-0.30-2.mga3.x86_64.rpm: Header V3 RSA/SHA1
    Signature, key ID 80420f66: NOKEY
result: /root/rpmbuild/RPMS/x86_64/lib64canberra0-0.30-2.dyw.x86_64.rpm
```

22.4 使用已安裝 Firefox 68 rpm 實例

1. 已安裝好的 firefox rpm 套件，沒有 gcin-gtk3 函式庫，先將此程式複製到 firefox 輸入法模組目錄中。

```
[root@dyw219 ~]# cp /usr/lib64/gtk-3.0/immodules/im-gcin.so \
/usr/lib64/firefox/bundled/lib64/gtk-3.0/3.0.0/immodules/im-gcin.so
```

2. 已安裝好的 firefox rpm 套件，沒有 gtk3 的 canberra 模組函式庫，先將函式庫複製到 firefox 的 bundled 目錄中。

```
[root@dyw219 tmp1]# cp -a /usr/lib64/gtk-3.0/modules/libcanberra-gtk-
    module.so\
 /usr/lib64/firefox/bundled/lib64/gtk-3.0/3.0.0/x86_64-pc-linux-gnu/
     modules/
[root@dyw219 tmp1]# cp -a /usr/lib64/gtk-3.0/modules/libcanberra-gtk3.so
    .0* \
/usr/lib64/firefox/bundled/lib64/
```

3. rpmrebuild -e 編輯目前安裝在系統的 firefox 套件，重新產生 rpm。

```
[root@dyw219 src]# rpmrebuild -e firefox
/usr/lib/rpmrebuild/rpmrebuild.sh: WARNING: some files have been
    modified:
S.5....T.    /usr/lib64/firefox/bundled/lib64/gtk-3.0/3.0.0/immodules.
    cache
S.5....T.    /usr/lib64/firefox/defaults/preferences/all-redhat.js
Do you want to continue ? (y/N) y
Do you want to change release number ? (y/N) y
Enter the new release (old: 4.el6_10): 4.el6_10.dyw
Do you want to continue ? (y/N) y
.....
```

```
%attr(0755, root, root) "/usr/lib64/firefox/bundled/lib64/gtk
    -3.0/3.0.0/\
immodules/im-gcin.so"
%dir %attr(0755, root, root) "/usr/lib64/firefox/bundled/lib64/gtk-3.0/\
3.0.0/x86_64-pc-linux-gnu/modules"
%attr(0755, root, root) %verify(link) "/usr/lib64/firefox/bundled/lib64
    /\
gtk-3.0/3.0.0/x86_64-pc-linux-gnu/modules/libcanberra-gtk-module.so"
%attr(0755, root, root) "/usr/lib64/firefox/bundled/lib64/gtk
    -3.0/3.0.0/\
x86_64-pc-linux-gnu/modules/libcanberra-gtk3-module.so"
%dir %attr(0755, root, root) %verify(link) "/usr/lib64/firefox/bundled/\
lib64/libcanberra-gtk3.so.0"
%dir %attr(0755, root, root) "/usr/lib64/firefox/bundled/lib64/
    libcanberra-gtk3.so.0.1.9"
.....
result: /root/rpmbuild/RPMS/x86_64/firefox-68.2.0-4.el6_10.dyw.x86_64.
    rpm
```

4. 使用 rpmrebuild 新產生的 rpm 安裝，不用再另安裝 gcin-gtk3，可正常使用 gcin 中文輸入。

22.5 Firefox 68 修改 SPEC 比較

1. 已安裝好的 firefox rpm 套件，沒有 gcin-gtk3 函式庫，先將此程式複製到 firefox 輸入法模組目錄中。

```
[root@dywmsi ~]# diff -uN firefox.spec.orig firefox.spec
--- firefox.spec.orig   2019-12-22 06:41:11.069854909 +0800
+++ firefox.spec    2019-12-22 06:32:44.970716495 +0800
@@ -1,6 +1,6 @@
 # rpmrebuild autogenerated specfile

-BuildRoot: /root/.tmp/rpmrebuild.17192/work/root
+%define defaultbuildroot /
 AutoProv: no
 %undefine __find_provides
 AutoReq: no
@@ -16,22 +16,22 @@
 %define _missing_doc_files_terminate_build 0
 #dummy
 #dummy
-#BUILDHOST:    sl6.fnal.gov
-#BUILDTIME:    Fri Nov  1 08:33:56 2019
-#SOURCERPM:    firefox-68.2.0-4.el6_10.src.rpm
+#BUILDHOST:    deyu.wang
+#BUILDTIME:    Sat Dec 21 22:26:32 2019
+#SOURCERPM:    firefox-68.2.0-4.el6_10.dyw.src.rpm
```

```
22
 #RPMVERSION:   4.8.0
24
-
26 +#INSTALLTIME:  Sat Dec 21 22:30:26 2019

28  #OS:           linux
-#SIZE:           322660508
30 -#ARCHIVESIZE:           324119576
+#SIZE:           323183045
32 +#ARCHIVESIZE:           324645364
 #ARCH:         x86_64
34  BuildArch:    x86_64
 Name:          firefox
36  Version:      68.2.0
-Release:       4.el6_10
38 +Release:       4.el6_10.dyw
 License:       MPLv1.1 or GPLv2+ or LGPLv2+
40  Group:         Unspecified
 Summary:       Mozilla Firefox Web browser
42 @@ -68,6 +68,11 @@
 Provides:      mimehandler(x-scheme-handler/https)
44  Provides:      firefox = 68.2.0-4.el6_10
 Provides:      firefox(x86-64) = 68.2.0-4.el6_10
46 +Provides:      firefox = 68.2.0-4.el6_10.dyw
+Provides:      firefox(x86-64) = 68.2.0-4.el6_10.dyw
48 +Provides:      firefox = 68.2.0-4.el6_10.dyw
+Provides:      firefox(x86-64) = 68.2.0-4.el6_10.dyw
50 +#Requires:      rpmlib(VersionedDependencies) <= 3.0.3-1
 Requires:      liberation-fonts-common
52  Requires:      liberation-sans-fonts
 Requires:      mesa-libEGL(x86-64)
54 @@ -80,16 +85,8 @@
 Requires:      nspr >= 4.21
56  Requires:      nss >= 3.44
 Requires:      redhat-indexhtml
58 -#Requires:      rpmlib(VersionedDependencies) <= 3.0.3-1
-Requires:      /bin/sh
60 -Requires:      /bin/sh
 Requires:      /bin/sh
62 -Requires:      /bin/sh
-#Requires:      rpmlib(FileDigests) <= 4.6.0-1
64 -#Requires:      rpmlib(PayloadFilesHavePrefix) <= 4.0-1
-#Requires:      rpmlib(CompressedFileNames) <= 3.0.4-1
66  Requires:      /bin/bash
-Requires:      /bin/sh
68  Requires:      ld-linux-x86-64.so.2()(64bit)
 Requires:      ld-linux-x86-64.so.2(GLIBC_2.3)(64bit)
70  Requires:      libc.so.6()(64bit)
@@ -219,6 +216,13 @@
72  Requires:      libz.so.1()(64bit)
 Requires:      libz.so.1(ZLIB_1.2.0)(64bit)
74  Requires:      rtld(GNU_HASH)
+Requires:      /bin/sh
```

```
+Requires:      /bin/sh
+Requires:      /bin/sh
+Requires:      /bin/sh
+#Requires:      rpmlib(FileDigests) <= 4.6.0-1
+#Requires:      rpmlib(PayloadFilesHavePrefix) <= 4.0-1
+#Requires:      rpmlib(CompressedFileNames) <= 3.0.4-1
 #Requires:      rpmlib(PayloadIsXz) <= 5.2-1
 #suggest
 #enhance
@@ -250,11 +254,14 @@
 %attr(0644, root, root) "/usr/lib64/firefox/browser/features/
     webcompat@mozilla.org.xpi"
 %attr(0644, root, root) "/usr/lib64/firefox/browser/omni.ja"
 %dir %attr(0755, root, root) "/usr/lib64/firefox/bundled/bin"
+%attr(0755, root, root) "/usr/lib64/firefox/bundled/bin/dconf"
+%attr(0755, root, root) "/usr/lib64/firefox/bundled/bin/dconf-service.
    sh"
 %attr(0755, root, root) "/usr/lib64/firefox/bundled/bin/fc-cache"
 %attr(0755, root, root) "/usr/lib64/firefox/bundled/bin/gdk-pixbuf-
     query-loaders-64"
 %attr(0755, root, root) "/usr/lib64/firefox/bundled/bin/gdk-pixbuf-
     thumbnailer"
 %attr(0755, root, root) "/usr/lib64/firefox/bundled/bin/gio-
     querymodules-64"
 %attr(0755, root, root) "/usr/lib64/firefox/bundled/bin/glib-compile-
     schemas"
+%attr(0755, root, root) "/usr/lib64/firefox/bundled/bin/gsettings"
 %attr(0755, root, root) "/usr/lib64/firefox/bundled/bin/gtk-query-
     immodules-3.0-64"
 %attr(0755, root, root) "/usr/lib64/firefox/bundled/bin/gtk-update-icon
     -cache"
 %dir %attr(0755, root, root) "/usr/lib64/firefox/bundled/etc"
@@ -308,6 +315,7 @@
 %dir %attr(0755, root, root) "/usr/lib64/firefox/bundled/lib64/gio"
 %dir %attr(0755, root, root) "/usr/lib64/firefox/bundled/lib64/gio/
     modules"
 %ghost %attr(0644, root, root) %verify(not md5 size link mtime) "/usr/
     lib64/firefox/bundled/lib64/gio/modules/giomodule.cache"
+%attr(0755, root, root) "/usr/lib64/firefox/bundled/lib64/gio/modules/
    libdconfsettings.so"
 %attr(0755, root, root) "/usr/lib64/firefox/bundled/lib64/gio/modules/
     libgiofam.so"
 %dir %attr(0755, root, root) "/usr/lib64/firefox/bundled/lib64/gtk-3.0"
 %dir %attr(0755, root, root) "/usr/lib64/firefox/bundled/lib64/gtk
     -3.0/3.0.0"
@@ -316,6 +324,7 @@
 %attr(0755, root, root) "/usr/lib64/firefox/bundled/lib64/gtk
     -3.0/3.0.0/immodules/im-am-et.so"
 %attr(0755, root, root) "/usr/lib64/firefox/bundled/lib64/gtk
     -3.0/3.0.0/immodules/im-cedilla.so"
 %attr(0755, root, root) "/usr/lib64/firefox/bundled/lib64/gtk
     -3.0/3.0.0/immodules/im-cyrillic-translit.so"
+%attr(0755, root, root) "/usr/lib64/firefox/bundled/lib64/gtk
    -3.0/3.0.0/immodules/im-gcin.so"
```

```
 %attr(0755, root, root) "/usr/lib64/firefox/bundled/lib64/gtk
     -3.0/3.0.0/immodules/im-inuktitut.so"
 %attr(0755, root, root) "/usr/lib64/firefox/bundled/lib64/gtk
     -3.0/3.0.0/immodules/im-ipa.so"
 %attr(0755, root, root) "/usr/lib64/firefox/bundled/lib64/gtk
     -3.0/3.0.0/immodules/im-multipress.so"
@@ -328,6 +337,9 @@
 %attr(0755, root, root) "/usr/lib64/firefox/bundled/lib64/gtk
     -3.0/3.0.0/printbackends/libprintbackend-cups.so"
 %attr(0755, root, root) "/usr/lib64/firefox/bundled/lib64/gtk
     -3.0/3.0.0/printbackends/libprintbackend-file.so"
 %attr(0755, root, root) "/usr/lib64/firefox/bundled/lib64/gtk
     -3.0/3.0.0/printbackends/libprintbackend-lpr.so"
+%dir %attr(0755, root, root) "/usr/lib64/firefox/bundled/lib64/gtk
    -3.0/3.0.0/x86_64-pc-linux-gnu/modules"
+%attr(0755, root, root) %verify(link) "/usr/lib64/firefox/bundled/lib64
    /gtk-3.0/3.0.0/x86_64-pc-linux-gnu/modules/libcanberra-gtk-module.so
    "
+%attr(0755, root, root) "/usr/lib64/firefox/bundled/lib64/gtk
    -3.0/3.0.0/x86_64-pc-linux-gnu/modules/libcanberra-gtk3-module.so"
 %attr(0777, root, root) "/usr/lib64/firefox/bundled/lib64/libatk-1.0.so
     .0"
 %attr(0755, root, root) "/usr/lib64/firefox/bundled/lib64/libatk-1.0.so
     .0.22209.1"
 %attr(0777, root, root) "/usr/lib64/firefox/bundled/lib64/libatk-bridge
     -2.0.so.0"
@@ -338,6 +350,12 @@
 %attr(0755, root, root) "/usr/lib64/firefox/bundled/lib64/libcairo-
     gobject.so.2.11400.8"
 %attr(0777, root, root) "/usr/lib64/firefox/bundled/lib64/libcairo.so.2
     "
 %attr(0755, root, root) "/usr/lib64/firefox/bundled/lib64/libcairo.so
     .2.11400.8"
+%attr(0755, root, root) %verify(link) "/usr/lib64/firefox/bundled/lib64
    /libcanberra-gtk3.so.0"
+%attr(0755, root, root) "/usr/lib64/firefox/bundled/lib64/libcanberra-
    gtk3.so.0.1.9"
+%attr(0777, root, root) "/usr/lib64/firefox/bundled/lib64/libdconf.so.1
    "
+%attr(0755, root, root) "/usr/lib64/firefox/bundled/lib64/libdconf.so
    .1.0.0"
+%attr(0777, root, root) "/usr/lib64/firefox/bundled/lib64/libffi.so.6"
+%attr(0755, root, root) "/usr/lib64/firefox/bundled/lib64/libffi.so
    .6.0.1"
 %attr(0777, root, root) "/usr/lib64/firefox/bundled/lib64/libfontconfig
     .so.1"
 %attr(0755, root, root) "/usr/lib64/firefox/bundled/lib64/libfontconfig
     .so.1.7.0"
 %attr(0777, root, root) "/usr/lib64/firefox/bundled/lib64/libfreetype.
     so.6"
@@ -373,10 +391,13 @@
 %dir %attr(0755, root, root) "/usr/lib64/firefox/bundled/libexec"
 %attr(0755, root, root) "/usr/lib64/firefox/bundled/libexec/at-spi-bus-
     launcher"
```

```
142  %attr(0755, root, root) "/usr/lib64/firefox/bundled/libexec/at-spi2-
         registryd"
    +%attr(0755, root, root) "/usr/lib64/firefox/bundled/libexec/dconf-
        service"
144  %dir %attr(0755, root, root) "/usr/lib64/firefox/bundled/share"
     %dir %attr(0755, root, root) "/usr/lib64/firefox/bundled/share/dbus-1"
146  %dir %attr(0755, root, root) "/usr/lib64/firefox/bundled/share/dbus-1/
         accessibility-services"
     %attr(0644, root, root) "/usr/lib64/firefox/bundled/share/dbus-1/
         accessibility-services/org.a11y.atspi.Registry.service"
148 +%dir %attr(0755, root, root) "/usr/lib64/firefox/bundled/share/dbus-1/
        services"
    +%attr(0644, root, root) "/usr/lib64/firefox/bundled/share/dbus-1/
        services/ca.desrt.dconf.service"
150  %dir %attr(0755, root, root) "/usr/lib64/firefox/bundled/share/defaults
         "
     %dir %attr(0755, root, root) "/usr/lib64/firefox/bundled/share/defaults
         /at-spi2"
152  %attr(0644, root, root) "/usr/lib64/firefox/bundled/share/defaults/at-
         spi2/accessibility.conf"
    @@ -7563,6 +7584,7 @@
154  %dir %attr(0755, root, root) "/usr/lib64/mozilla/extensions/{ec8030f7-
         c20a-464f-9b0e-13a3a9e97384}"
     %attr(0644, root, root) "/usr/share/appdata/firefox.appdata.xml"
156  %attr(0644, root, root) "/usr/share/applications/firefox.desktop"
    +%attr(0777, root, root) "/usr/share/dbus-1/services/ca.desrt.dconf.
        service"
158  %attr(0644, root, root) "/usr/share/icons/hicolor/16x16/apps/firefox.
         png"
     %attr(0644, root, root) "/usr/share/icons/hicolor/22x22/apps/firefox.
         png"
160  %attr(0644, root, root) "/usr/share/icons/hicolor/24x24/apps/firefox.
         png"
```

22.6 使用已安裝 Chromium-Browser 72 rpm 實例

1. 已安裝好的 chromium-browser rpm 套件，沒有 gcin-gtk3 函式庫，先將此程式複製到 chromium-browser 輸入法模組目錄中。

```
[root@dyw219 ~]# cp /usr/lib64/gtk-3.0/immodules/im-gcin.so \
2 /opt/chromium-browser/bundled/lib64/gtk-3.0/3.0.0/immodules/im-gcin.so
```

2. rpmrebuild -e 編輯目前安裝在系統的 chromium-browser 套件，重新產生 rpm。

```
[root@dyw219 ~]# cd /usr/src
```

```
[root@dyw219 src]# rpmrebuild -e chromium-browser
/usr/lib/rpmrebuild/rpmrebuild.sh: WARNING: some files have been
    modified:
S.5....T.    /opt/chromium-browser/bundled/lib64/gtk-3.0/3.0.0/immodules
    .cache
Do you want to continue ? (y/N) y
Do you want to change release number ? (y/N) y
Enter the new release (old: 1.el6_10): 1.el6_10.dyw
.....
%attr(0644, root, root) "/opt/chromium-browser/bundled/lib64/gtk
    -3.0/3.0.0/immodules.cache"
%attr(0755, root, root) "/opt/chromium-browser/bundled/lib64/gtk
    -3.0/3.0.0/immodules/im-gcin.so"
%attr(0755, root, root) "/opt/chromium-browser/bundled/lib64/gtk
    -3.0/3.0.0/immodules/im-am-et.so"
.....
Do you want to continue ? (y/N) y
result: /root/rpmbuild/RPMS/x86_64/chromium-browser-72.0.3626.96-1.
    el6_10.dyw.x86_64.rpm
```

3. 使用 rpmrebuild 新產生的 rpm 安裝，不用再另安裝 gcin-gtk3，可正常使用 gcin 中文輸入。

Chapter 23

MacBook Pro + DYW Linux

23.1 前言

1. MacBook Pro 工具 Boot Camp Assistant 可以安裝 Windows，進行雙系統開機，但此工具無法安裝 Linux。
2. 可以找到 Debian (ubuntu) 有提供工具及 ISO 可以安裝到 MacBook Pro，但 RedHat 系列的 Linux 沒有。
3. 本章目的爲在 MacBook Pro 安裝客製化 DYW Linux 系統。
4. 參考文件

23.2 製作 MacBook USB 開機碟

1. MacBook 預設使用整個硬碟，要安裝 Linux 系統必須將硬碟分割出一個分割區，做爲安裝 Linux 用。

```
Finder --> Application --> Utilties --> Disk Utility
選取硬碟 --> Partition --> 選取硬碟圓餅圖縮小目前系統空間 -->
多出來的分割區格式選 MS-DOS (FAT) -->
Linux 安裝時會進再行格式化
```

2. 下載 Mac Linux USB Loader。

```
https://sevenbits.github.io/Mac-Linux-USB-Loader/
```

3. 下載 DYW Linux ISO。

```
1 http://dywang.csie.cyut.edu.tw/moodle23/blog/index.php?entryid=367
```

4. 插上要製作的 USB 隨身碟，從 Download 目錄啓動下載的 Mac Linux USB Loader 程式，點選：

```
1 Finder --> Downloads --> Mac Linux USB Loader

3     Create Live USB
          選擇 USB 要開機的 DYW Linux ISO
5         選擇 USB 隨身碟
          開始安裝
```

5. 完成後會出現文字編輯器，進行 enterprise.cfg 開機參數設定。如果不知道怎麼設定可參考提示的網頁，這個檔的主要項目與 grub 類似，重點是 kernel 及 initrd 的設定，其中核心 vmlinuz 及 initrd 都必須指定位置，所以必須確認 USB 碟在開機時的編號。核心參數可以指定 kickstart 自動安裝檔及 repo 套件來源位置。

```
# enterprise.cfg
2 #
# This file is used to configure Enterprise. You need to fill out
4 the following parameters according to how your desired Linux
distribution configures its ISO file.
6
# Please see https://sevenbits.github.io/Enterprise/ for more
    information.
8 entry Custom
iso boot.iso
10 kernel (hd0,msdos1)/isolinux/vmlinuz ks=hd:sdb1:/add/crt-ks.cfg repo=hd:
    sdb1/ boot=(hd0,msdos1)/
initrd (hd0,msdos1)/isolinux/initrd.img
```

23.3 修改 MacBook USB 開機碟

1. Mac Linux USB Loader 可以直接下載 Debian 系列的 Linux ISO，但沒有 Redhat 系列的 Linux ISO，而且 Macbook 使用 EFI 不是 BIOS，所以開機碟還必須做一些修改。

2. DYW Linux 是以 CentOS 6 爲基礎，在 USB Loader 製作時最後會有錯誤的警告訊息，除了確認 enterprise.cfg 設定正確外，還必須將開機 ISO 檔

掛載起來，將其包含 efiboot.img 的 images 目錄整個複製到 USB 開機碟放 kernel 的目錄下。在 Linux 系統插上 USB 隨身碟，此例 USB 掛載在 /media/UNTITLED，將 USB 碟中的 boot.iso 掛載在 /mnt/boot 目錄。

```
[root@dywnb ~]# mount -oloop /media/UNTITLED/efi/boot/boot.iso /mnt/boot
    /
```

3. 將 iso 中的 isolinux, add, images 三個目錄複製到 USB 碟的根目錄。

```
[root@dywnb ~]# cp -a /mnt/boot/isolinux /media/UNTITLED/
[root@dywnb ~]# cp -a /mnt/boot/add  /media/UNTITLED/
[root@dywnb ~]# cp -a /mnt/boot/images  /media/UNTITLED/
```

4. DYW linux 預設核心版本爲 2.6，必須將核心更新到 4.4.5 版，否則有些裝置驅動不了，例如 webcam, 無線網卡等。所以先把 kernel-ml 核心複製到 USB 隨身碟。

```
[root@dywnb ~]# cd /media/UNTITLED/
[root@dywnb UNTITLED]# wget http://dywang.csie.cyut.edu.tw/kernel/ltml/
    RPMS/\
kernel-ml-firmware-4.4.5-1.el6.elrepo.noarch.rpm
[root@dywnb UNTITLED]# wget http://dywang.csie.cyut.edu.tw/kernel/ltml/
    RPMS/\
kernel-ml-4.4.5-1.el6.elrepo.x86_64.rpm
[root@dywnb UNTITLED]# cd
[root@dywnb ~]#
```

5. 修改 kickstart 自動安裝檔，取消 %pre 段落的安裝隨身碟自動偵測，改爲手動分割碟碟。

```
[root@dywnb ~]# vim /media/UNTITLED/add/crt-ks.cfg
```

6. 卸載 iso 及 USB 碟，將 USB 碟插到 Macbook 的 USB 槽。

```
[root@dywnb ~]# umount /mnt/boot/
[root@dywnb ~]# umount /media/UNTITLED/
```

7. Mac 重新開機，按下 Optional(alt) 出現 USB 開機選項，選擇 USB 開機，若 enterprise.cfg 設定正確，就會依指定的 kickstart 自動安裝檔安裝。因不是

安裝到隨身碟，所以安裝過程會出現安裝目的硬碟的選取及分割，必須進行手動分割。

8. 由於 Mac 使用 EFI 開機，必須分割一塊 efi 開機區掛載在 /boot/efi 目錄，且將開機管理程式安裝 /boot/efi 掛載的分割區。

9. 安裝好後，Mac 重開機，不按任何鍵，會自動以新安裝的 Linux 系統開機，若要使用 Mac 的 iOS，則要於開機時按下 Optional(alt)，選擇 HD 開機。

23.4 Mac Linux Wifi

1. 先安裝新核心及韌體，要先安裝 kernel-ml-firmware 再安裝 kernel-ml。

```
[root@dywmac ~]# rpm -e kernel-ml-firmware
[root@dywmac ~]# rpm -ivh /media/UNTITLED/kernel-ml-firmware-4.4.5-1.el6
    .elrepo.noarch.rpm
[root@dywmac ~]# rpm -ivh /media/UNTITLED/kernel-ml-4.4.5-1.el6.elrepo.
    noarch.rpm
```

2. Macbook pro 無內建有線網卡，只有無線網卡。4.4.5 版的韌體及核心可以驅動 macbook 的無線網卡。如果有問題可以 下載驅動程式 brcmfmac43602-ocie.bin。

```
[root@dywmac ~]# wget https://git.kernel.org/cgit/linux/kernel/git/\
firmware/linux-firmware.git/plain/brcm/brcmfmac43602-pcie.bin
```

3. 在 firmware 目錄下建立 brcm 並將下載的驅動程式複製至此目錄中。

```
[root@dywmac ~]# mkdir /lib/firmware/brcm/
[root@dywmac ~]# cp brcmfmac43602-pcie.bin /lib/firmware/brcm/
```

4. 載入 brvmfmac，順利的話應該可以開始設定 wifi。

```
[root@dywmac ~]# modprobe -r brcmfmac
[root@dywmac ~]# modprobe brcmfmac

[root@dywmac ~]# lsmod | grep brcmfmac
brcmfmac              253952  0
brcmutil               16384  1 brcmfmac
cfg80211              548864  1 brcmfmac
mmc_core              135168  1 brcmfmac
```

5. 重新啓動網路管理程式 NetworkManager，出現沒有 /etc/sysconfig/network 檔，必須先產生此檔。

```
[root@dywmac ~]# vim /etc/sysconfig/network
[root@dywmac ~]# cat /etc/sysconfig/network
NETWORKING=yes
HOSTNAME=dywmac
```

6. 重新啓動網路管理程式 NetworkManager。

```
[root@dywmac ~]# /etc/init.d/NetworkManager restart
```

7. 使用 VPN 連線時，必須載入 nf_conntrack_pptp 核心模組。

```
[root@dywmac ~]# modprobe nf_conntrack_pptp
```

23.5 Mac Linux 桌面調整

1. 配備 Retina 顯示器的 Macbook pro 螢幕解析度很高，以 Linux 開機後畫面上文字圖像都很小，若直接變更螢幕顯示解析度，不但螢幕顯示範圍變小且 Mac 原有 Retina 顯示器的美則大打折扣。

2. 設定 gnome 顯示字型及大小，重點爲 Resolution 爲 170 dots per inch 及字型大小，使用的字型可以統一於.fonts.conf 進行取代。

```
system --> Preference --> Appearance --> Font
Application font: Noto Sans TC Regular 11
Document font: Noto Sans TC  Regular 11
Desktop font: Noto Sans TC  Regular 10
Window title font: Noto Sans TC  Regular  9
Fixed width font: DejaVu Sans Mono Regular 11

Resolution: 170 dots per inch
```

3. 已經設定桌面的字型大小與解析度，配合.fonts.conf 設定檔的字型取代，Firefox 可以不用調整。Firefox 若要個別調整可安裝 Zoom Page 附加元件，預設 120%，字型設定如下：

```
Tranditional Chinese (Taiwan)
Proportional: Sans Serif 16
Serif: Noto Sans TC Medium
Sans-serif: Noto Sans TC Medium
Monospace: Noto Sans TC Medium 16
Minimum font size: 12

Latin
Proportional: Sans Serif 15
Serif: serif
Sans-serif: sans-serif
Monospace: monospace 15
Minimum font size: 12
```

4. Firefox menu 及網址列 icon size 增大 150%：

```
(1) Type abbout:config in the address bar and press Enter.
(2) In the filter box, type or paste pix and pause while the list is
    filtered
(3) Double-click layout.css.devPixelsPerPx and try changing its value to
     1.5
```

5. Chrome 預設 Zoom 120%，字型設定如下：

```
Standard font: Noto Sans TC Medium 16px
Serif: Noto Sans TC Medium
Sans-Serif: Noto Sans TC Medium
Fixed-width font: Noto Sans TC Medium 16px
Minimum font size: 12px
```

6. 爲維持原有解析度，經過調整後整理目前狀況字型與顯示與 Mac OS 接近。Mac 解析度高改用 Noto 字型並對所有字型預設開 antialias，關 hinting，hintstyle 爲 hintslight，字型不會鋸齒狀且不會模糊。非 Mac 螢幕若這樣設定，字體會很糊，所以非 Mac 螢幕英文字以 DejaVu 爲主，中文以 AR PL UMing TW 爲主，且所有字型預設開 antialias，16 以下字型開 hinting，16 以上字型關 hinting，hintstyle 爲 hintfull，如此設定一般字型鋸齒不明顯但很清楚，16 以上的字型反鋸齒且不會太模糊。Macbook 家目錄中的.fonts.conf 設定如下：

```
[root@dywmac ~]# cat /home/dywang/.fonts.conf
<?xml version="1.0"?>
<!DOCTYPE fontconfig SYSTEM "fonts.dtd">

<fontconfig>
<!--爲不帶粗體的宋明楷體合成粗體。-->
<match target="font">
        <test name="family" compare="contains">
                <string>宋</string>
                <string>明</string>
                <string>楷</string>
                <string>Song</string>
                <string>Sun</string>
                <string>Ming</string>
                <string>Kai</string>
        </test>
        <test compare="more_eq" target="pattern" name="weight">
                <int>180</int>
        </test>
        <edit mode="assign" name="embolden">
                <bool>false</bool>
        </edit>
</match>

<!-- 解決中文字體英文間距過寬 -->
<match target="font">
        <test target="pattern" name="lang" compare="contains">
                <string>zh</string>
                <string>ja</string>
                <string>ko</string>
        </test>
        <test name="spacing" compare="eq">
                <const>dual</const>
        </test>
        <edit name="spacing">
                <const>proportional</const>
        </edit>
        <edit name="globaladvance">
                <bool>false</bool>
        </edit>
</match>

<alias>
        <family>微軟正黑體</family>
        <family>黑体</family>
        <family>細明體</family>
        <family>新細明體</family>
        <family>sans-serif</family>
        <prefer>
                <family>Noto Sans CJK TC Medium</family>
        </prefer>
</alias>

```

```
<alias>
        <family>標楷體</family>
        <prefer>
                <family>Noto Sans CJK TC Medium</family>
        </prefer>
</alias>
<!--適應正體中文用户的用字習慣，可依個人喜好修改。-->
<alias>
        <family>serif</family>
        <prefer>
                <family>Noto Sans CJK TC Medium</family>
                <family>DejaVu Serif</family>
                <family>DejaVu Sans</family>
                <family>DejaVu Sans Mono</family>
                <family>AR PL UMing TW</family>
                <family>AR PL UMing CN</family>
        </prefer>
</alias>

<alias>
        <family>Sans</family>
        <prefer>
                <family>Noto Sans CJK TC Medium</family>
                <family>DejaVu Sans</family>
                <family>DejaVu Serif</family>
                <family>DejaVu Sans Mono</family>
                <family>AR PL UMing TW</family>
                <family>AR PL UMing CN</family>
        </prefer>
</alias>
<alias>
        <family>Sans-serif</family>
        <prefer>
                <family>Noto Sans CJK TC Medium</family>
                <family>DejaVu Sans</family>
                <family>DejaVu Serif</family>
                <family>DejaVu Sans Mono</family>
                <family>AR PL UMing TW</family>
                <family>AR PL UMing CN</family>
        </prefer>
</alias>

<alias>
        <family>Monospace</family>
        <prefer>
                <family>DejaVu Sans Mono</family>
                <family>Noto Sans CJK TC Medium</family>
                <family>DejaVu Sans</family>
                <family>DejaVu Serif</family>
                <family>AR PL UMing TW</family>
                <family>AR PL UMing CN</family>
        </prefer>
</alias>
<!--所有字型預設開AA開hinting-->
```

```
<match target="font">
109         <edit name="antialias" mode="assign"><bool>true</bool></edit>
            <edit name="hinting" mode="assign"><bool>false</bool></edit>
111         <edit name="autohint" mode="assign"><bool>false</bool></edit>
            <edit name="hintstyle" mode="assign"><const>hintslight</const></
                edit>
113 </match>
</fontconfig>
```

7. gdm 登入畫面字型大小調整，先備份 gdm-simple-slave，這個檔案是二進位可執行檔，改錯則無法執行。取代字串 verbose 爲 dpi 170，數字 170 是三個字元，若要改成 96，則 96 後面要加一個空白字元。

```
[root@dywmac ~]# cp /usr/libexec/gdm-simple-slave /tmp/
2 [root@dywmac ~]# sed 's/verbose/dpi 170/g' -i /usr/libexec/gdm-simple-
    slave
```

23.6 Macbook Console Font Size

1. Macbook pro 螢幕解析度度爲 2560x1600，文字模式的終端機字非常小無法操作。修改開機核心載入 vga=xxx 無效，載入 video=xxxx 指定螢幕解析度。

```
[root@dywmac ~]# vim /boot/efi/EFI/redhat/grub.conf
2 [root@dywmac ~]# grep video /boot/efi/EFI/redhat/grub.conf
    kernel /vmlinuz-.............. quiet video=1024x800
```

2. kernel 4.5 以上變更螢幕解析度度雖然可以將文字模式的終端機字型變大，但卻沒有改變終端機的行列數，以致於過長文字及超過的執行列會跑到螢幕外，仍需要調整。爲解決此問題可以將預設字型 SYSFONT=latarcyrheb-sun16 由 16 增到 32。

```
1 [root@dywmac ~]# vim /boot/efi/EFI/redhat/grub.conf
[root@dywmac ~]# grep video /boot/efi/EFI/redhat/grub.conf
3     kernel /vmlinuz-..... SYSFONT=latarcyrheb-sun16 ........ quiet
```

3. 查終端機系統字型在 /lib/kbd/consolefonts 目錄下。

```
1 [root@dywmac ~]# find /lib* -name latarcyr*
/lib/kbd/consolefonts/latarcyrheb-sun16.psfu.gz
```

4. 在系統字型 /lib/kbd/consolefonts 目錄下找不到 32 點字型。

```
[root@dywmac ~]# ls /lib/kbd/consolefonts/*32*
ls: cannot access /lib/kbd/consolefonts/*32*: No such file or directory
```

5. 使用 yum 查到 terminus-fonts-console 套件包含 32 的字型。

```
[root@dywmac ~]# yum provides /lib/kbd/consolefonts/*32* --enablerepo=
    centos
.......
terminus-fonts-console-4.30-1.el6.noarch : Clean fixed width font (
    console version)
Repo        : installed
Matched from:
Other       : Provides-match: /lib/kbd/consolefonts/ter-v32n.psf.gz
```

6. 安裝 terminus-fonts-console 套件。

```
[root@dywmac ~]# yum install terminus-fonts-console --enablerepo=centos
```

7. 在系統字型 /lib/kbd/consolefonts 目錄下已有 32 點字型。

```
[root@dywmac ~]# ls /lib/kbd/consolefonts/*32*
/lib/kbd/consolefonts/ter-132b.psf.gz  /lib/kbd/consolefonts/ter-g32n.
    psf.gz
/lib/kbd/consolefonts/ter-132n.psf.gz  /lib/kbd/consolefonts/ter-i32b.
    psf.gz
/lib/kbd/consolefonts/ter-232b.psf.gz  /lib/kbd/consolefonts/ter-i32n.
    psf.gz
/lib/kbd/consolefonts/ter-232n.psf.gz  /lib/kbd/consolefonts/ter-k32b.
    psf.gz
/lib/kbd/consolefonts/ter-732b.psf.gz  /lib/kbd/consolefonts/ter-k32n.
    psf.gz
/lib/kbd/consolefonts/ter-732n.psf.gz  /lib/kbd/consolefonts/ter-m32b.
    psf.gz
/lib/kbd/consolefonts/ter-932b.psf.gz  /lib/kbd/consolefonts/ter-m32n.
    psf.gz
/lib/kbd/consolefonts/ter-932n.psf.gz  /lib/kbd/consolefonts/ter-p32b.
    psf.gz
/lib/kbd/consolefonts/ter-c32b.psf.gz  /lib/kbd/consolefonts/ter-p32n.
    psf.gz
```

```
/lib/kbd/consolefonts/ter-c32n.psf.gz  /lib/kbd/consolefonts/ter-u32b.psf.gz
/lib/kbd/consolefonts/ter-d32b.psf.gz  /lib/kbd/consolefonts/ter-u32n.psf.gz
/lib/kbd/consolefonts/ter-d32n.psf.gz  /lib/kbd/consolefonts/ter-v32b.psf.gz
/lib/kbd/consolefonts/ter-g32b.psf.gz  /lib/kbd/consolefonts/ter-v32n.psf.gz
```

8. Grub 設定開機核心載入終端機系統字型使用 ter-932n 32 點字型。

```
[root@dywmac ~]# vim /boot/efi/EFI/redhat/grub.conf
[root@dywmac ~]# grep ter-932n /boot/efi/EFI/redhat/grub.conf
    kernel /vmlinuz ...... SYSFONT=ter-932n ...... quiet
```

9. kernel 4.3 版 Grub 設定開機核心載入終端機系統字型使用 ter-932n 32 點字型，並且使用 video 參數不會有顯示超出螢幕的問題。

```
[root@dywmac ~]# vim /boot/efi/EFI/redhat/grub.conf
[root@dywmac ~]# grep ter-932n /boot/efi/EFI/redhat/grub.conf
    kernel /vmlinuz ...... SYSFONT=ter-932n ...... quiet video=1280x800
```

10. 開機及終端機系統字型於開機核心參數設定無效，在 i18n 設定使用 ter-932n 32 點字型。

```
[root@dywmac ~]# vim /etc/sysconfig/i18n
[root@dywmac ~]# cat /etc/sysconfig/i18n
LANG="en_US.UTF-8"
#SYSFONT="latarcyrheb-sun16"
SYSFONT="ter-132n"
```

11. 修改 dracut 預設 SYSFONT，重新產生開機 initramfs 檔案，開機時才會使用 ter-932n 32 點字型。

```
[root@dywmac ~]# vim /usr/share/dracut/modules.d/10redhat-i18n/install
[root@dywmac ~]# grep SYSFONT /usr/share/dracut/modules.d/10redhat-i18n/install
    [[ $SYSFONT ]] || SYSFONT=ter-932n
    for FN in ${kbddir}/consolefonts/$SYSFONT.* ; do
    [[ $SYSFONTACM ]] && inst ${kbddir}/consoletrans/$SYSFONTACM

[root@dywmac ~]# dracut -f /boot/initramfs-4.7.0-1.el6.elrepo.x86_64.img 4.7.0-1.el6.elrepo.x86_64
```

12. 若還是有問題，在第一支程式 init 設定 SYSFONT 爲 sun-932n。

```
[root@dywmac ~]# vim /etc/sysconfig/init
[root@dywmac ~]# head -1 /etc/sysconfig/init
setfont ter-932n
```

23.7 Macbook pro keyboard

1. 沒有 backspace 鍵，delete 的動作等效 backspce，若要使用原有 delete 刪本游漂位置上的字元功能，必須以 fn+delete 取代。

2. 鍵盤左邊的鍵無法出現預期的家目錄符號 tilde ~ 及預執行符號 `，而是出現大小於符號 <>，使用 Linux 時造成相當大的不便，修改以下設定可以解決。

```
[root@dywmac ~]# echo 0 > /sys/module/hid_apple/parameters/iso_layout
```

3. 增加核心載入 hid_apple 模組時加入參數 iso_layout=0，就可以永久使用這樣的設定。

```
[root@dywmac ~]# vim /etc/modprobe.d/hid_apple.conf
[root@dywmac ~]# cat /etc/modprobe.d/hid_apple.conf
options hid_apple iso_layout=0
```

4. 如果增加核心載入 hid_apple 模組時加入參數 iso_layout=0 無效，可以先在 rc.local 檔增加一行設定，讓開機使用這樣的設定。

```
[root@dywmac ~]# vim /etc/rc.d/rc.local
[root@dywmac ~]# grep apple /etc/rc.d/rc.local
echo 0 > /sys/module/hid_apple/parameters/iso_layout
```

5. MacBook 上沒有 Insert 鍵，使用 fn+return 可達此效果。

6. MacBook 上的 delete 鍵等效 backspace，要用 fn+delete 才能達到 delete 的效果。

23.8 Mac Default Brightness

1. Macbook pro 開機預設爲最高亮度，調整爲中等亮度。

```
[root@dywmac ~]# vim /etc/rc.local
[root@dywmac ~]# tail -1 /etc/rc.local
echo 256 > /sys/class/backlight/intel_backlight/brightness
```

23.9 Mac Startup boot Sound

1. Macbook pro 開機預設有啓動音效，在需要安靜的環境開機會造成困擾，要關閉開機音效，重新以 Mac OS 開機，打關終端機輸入以下設定：

```
sudo nvram SystemAudioVolume=%00
sudo nvram SystemAudioVolume=""
sudo nvram -d SystemAudioVolume
```

2. 上述方法若無效，則重新以 Mac OS 開機，執行以下動作：

```
Finder --> Application --> System Preference --> Sound --> 關閉
```

23.10 Mac Webcam (NOT WORK)

1. Macbook pro 內建 webcam 無驅動程式，網路有相關程式，必須下載編譯。

```
[root@dywmac src]# git clone https://github.com/patjak/bcwc_pcie/
```

2. 安裝核心發展套件。

```
[root@dywmac src]# rpm -ivh http://dywang.csie.cyut.edu.tw/kernel/ltml/
    RPMS/\
kernel-ml-devel-4.3.3-1.el6.elrepo.x86_64.rpm
```

3. 以此核心版本編譯，雖完成編譯，但有警告訊息，且開機載入不成功。

```
[root@dywmac src]# cd /usr/src/bcwc_pcie
[root@dywmac bcwc_pcie]# make
make -C /lib/modules/4.3.3-1.el6.elrepo.x86_64/build M=/usr/src/
    bcwc_pcie modules
make[1]: Entering directory `/usr/src/kernels/4.3.3-1.el6.elrepo.x86_64'
  CC [M]  /usr/src/bcwc_pcie/fthd_ddr.o
  CC [M]  /usr/src/bcwc_pcie/fthd_hw.o
  CC [M]  /usr/src/bcwc_pcie/fthd_drv.o
  CC [M]  /usr/src/bcwc_pcie/fthd_ringbuf.o
  CC [M]  /usr/src/bcwc_pcie/fthd_isp.o
/usr/src/bcwc_pcie/fthd_isp.c: In function ‘
    fthd_isp_cmd_channel_camera_config’ :
/usr/src/bcwc_pcie/fthd_isp.c:662:2: warning: ‘ret’ may be used
    uninitialized
 in this function [-Wmaybe-uninitialized]
  return ret;
  ^
  CC [M]  /usr/src/bcwc_pcie/fthd_v4l2.o
/usr/src/bcwc_pcie/fthd_v4l2.c:298:2: warning: initialization from
 incompatible pointer type [enabled by default]
  .queue_setup            = fthd_buffer_queue_setup,
  ^
/usr/src/bcwc_pcie/fthd_v4l2.c:298:2: warning: (near initialization
 for ‘vb2_queue_ops.queue_setup’ ) [enabled by default]
  CC [M]  /usr/src/bcwc_pcie/fthd_buffer.o
  CC [M]  /usr/src/bcwc_pcie/fthd_debugfs.o
  LD [M]  /usr/src/bcwc_pcie/facetimehd.o
  Building modules, stage 2.
  MODPOST 1 modules
WARNING: "__fentry__" [/usr/src/bcwc_pcie/facetimehd.ko] undefined!
  CC      /usr/src/bcwc_pcie/facetimehd.mod.o
  LD [M]  /usr/src/bcwc_pcie/facetimehd.ko
make[1]: Leaving directory `/usr/src/kernels/4.3.3-1.el6.elrepo.x86_64'
```

4. 安裝 4.4.5-1 版核心發展套件。

```
[root@dywmac RPMS]# rpm -ivh kernel-ml-devel-4.4.5-1.el6.elrepo.x86_64.
    rpm
```

5. 編譯 facetimehd。

```
[root@dywmac RPMS]# cd /usr/src/bcwc_pcie/
[root@dywmac bcwc_pcie]# make
make -C /lib/modules/4.4.5-1.el6.elrepo.x86_64/build M=/usr/src/
    bcwc_pcie modules
make[1]: Entering directory `/usr/src/kernels/4.4.5-1.el6.elrepo.x86_64'
  CC [M]  /usr/src/bcwc_pcie/fthd_ddr.o
  CC [M]  /usr/src/bcwc_pcie/fthd_hw.o
```

```
  CC [M]  /usr/src/bcwc_pcie/fthd_drv.o
  CC [M]  /usr/src/bcwc_pcie/fthd_ringbuf.o
  CC [M]  /usr/src/bcwc_pcie/fthd_isp.o
/usr/src/bcwc_pcie/fthd_isp.c: In function ‘
    fthd_isp_cmd_channel_camera_config’ :
/usr/src/bcwc_pcie/fthd_isp.c:662:2: warning: ‘ret’ may be used
    uninitialized
 in this function [-Wmaybe-uninitialized]
  return ret;
  ^
  CC [M]  /usr/src/bcwc_pcie/fthd_v4l2.o
  CC [M]  /usr/src/bcwc_pcie/fthd_buffer.o
  CC [M]  /usr/src/bcwc_pcie/fthd_debugfs.o
  LD [M]  /usr/src/bcwc_pcie/facetimehd.o
  Building modules, stage 2.
  MODPOST 1 modules
WARNING: "__fentry__" [/usr/src/bcwc_pcie/facetimehd.ko] undefined!
  CC      /usr/src/bcwc_pcie/facetimehd.mod.o
  LD [M]  /usr/src/bcwc_pcie/facetimehd.ko
make[1]: Leaving directory `/usr/src/kernels/4.4.5-1.el6.elrepo.x86_64'
```

6. 安裝 facetimehd 模組。

```
[root@dywmac bcwc_pcie]# make install
make -C /lib/modules/4.4.5-1.el6.elrepo.x86_64/build M=/usr/src/
    bcwc_pcie modules_install
make[1]: Entering directory `/usr/src/kernels/4.4.5-1.el6.elrepo.x86_64'
  INSTALL /usr/src/bcwc_pcie/facetimehd.ko
  DEPMOD  4.4.5-1.el6.elrepo.x86_64
WARNING: /lib/modules/4.4.5-1.el6.elrepo.x86_64/extra/facetimehd.ko
    needs unknown symbol __fentry__
make[1]: Leaving directory `/usr/src/kernels/4.4.5-1.el6.elrepo.x86_64'
```

7. 無法載入 facetimehd 模組。

```
[root@dywmac bcwc_pcie]# modprobe facetimehd
FATAL: Error inserting facetimehd (/lib/modules/4.4.5-1.el6.elrepo.
    x86_64/extra/facetimehd.ko):
 Unknown symbol in module, or unknown parameter (see dmesg)
```

8. 目前 gcc 版本 4.8，版本不對，降低版本至 4.4。

```
[root@dywmac bcwc_pcie]# yum downgrade gcc-* libstdc++* cpp libgomp
```

9. 再編譯已無 __fentry__ 相關的錯誤訊息。

```
[root@dywmac bcwc_pcie]# make
make -C /lib/modules/4.4.5-1.el6.elrepo.x86_64/build M=/usr/src/
    bcwc_pcie modules
make[1]: Entering directory `/usr/src/kernels/4.4.5-1.el6.elrepo.x86_64'
  CC [M]  /usr/src/bcwc_pcie/fthd_ddr.o
  CC [M]  /usr/src/bcwc_pcie/fthd_hw.o
  CC [M]  /usr/src/bcwc_pcie/fthd_drv.o
  CC [M]  /usr/src/bcwc_pcie/fthd_ringbuf.o
  CC [M]  /usr/src/bcwc_pcie/fthd_isp.o
/usr/src/bcwc_pcie/fthd_isp.c: In function ‘
    fthd_isp_cmd_channel_camera_config’:
/usr/src/bcwc_pcie/fthd_isp.c:647: warning: ‘ret’ may be used
    uninitialized in this function
  CC [M]  /usr/src/bcwc_pcie/fthd_v4l2.o
  CC [M]  /usr/src/bcwc_pcie/fthd_buffer.o
  CC [M]  /usr/src/bcwc_pcie/fthd_debugfs.o
  LD [M]  /usr/src/bcwc_pcie/facetimehd.o
  Building modules, stage 2.
  MODPOST 1 modules
  CC      /usr/src/bcwc_pcie/facetimehd.mod.o
  LD [M]  /usr/src/bcwc_pcie/facetimehd.ko
make[1]: Leaving directory `/usr/src/kernels/4.4.5-1.el6.elrepo.x86_64'
```

10. 安裝 facetimehd 模組。

```
[root@dywmac bcwc_pcie]# make install
make -C /lib/modules/4.4.5-1.el6.elrepo.x86_64/build M=/usr/src/
    bcwc_pcie modules_install
make[1]: Entering directory `/usr/src/kernels/4.4.5-1.el6.elrepo.x86_64'
  INSTALL /usr/src/bcwc_pcie/facetimehd.ko
  DEPMOD  4.4.5-1.el6.elrepo.x86_64
make[1]: Leaving directory `/usr/src/kernels/4.4.5-1.el6.elrepo.x86_64'
```

11. 成功載入 facetimehd 模組。

```
[root@dywmac bcwc_pcie]# modprobe facetimehd
[root@dywmac bcwc_pcie]# lsmod | grep facetimehd
facetimehd             69632  0
videobuf2_v4l2         28672  2 uvcvideo,facetimehd
videobuf2_dma_sg       20480  1 facetimehd
videobuf2_core         36864  3 uvcvideo,facetimehd,videobuf2_v4l2
videodev              180224  5 uvcvideo,facetimehd,videobuf2_v4l2,
    v4l2_common,videobuf2_core
```

12. 但還是沒有 webcam，查詢 log 發現沒有 firmware.bin。

```
[root@dywmac ~]# tail /var/log/messages
Sep 21 08:52:18 localhost kernel: facetimehd 0000:02:00.0: VDL set to:
    coarse=0x10008, fine=0x1011a
Sep 21 08:52:18 localhost kernel: facetimehd 0000:02:00.0: Virtual VTT
    enabled
Sep 21 08:52:18 localhost kernel: facetimehd 0000:02:00.0: S2 DRAM
    memory address: 0x22159559
Sep 21 08:52:18 localhost kernel: facetimehd 0000:02:00.0: Rewrite DDR
    mode registers succeeded
Sep 21 08:52:18 localhost kernel: facetimehd 0000:02:00.0: Full memory
    verification succeeded! (0)
Sep 21 08:52:18 localhost kernel: facetimehd 0000:02:00.0: Direct
    firmware load for facetimehd/firmware.bin failed with error -2
Sep 21 08:52:18 localhost kernel: facetimehd 0000:02:00.0: Falling back
    to user helper
Sep 21 08:52:18 localhost kernel: facetimehd: probe of 0000:02:00.0
    failed with error -11
Sep 21 08:52:18 localhost firmware.sh[3287]: Cannot find  firmware file
    'facetimehd/firmware.bin'
Sep 21 08:52:19 localhost pulseaudio[2965]: ratelimit.c: 28 events
    suppressed
```

13. 但還是沒有 webcam，查詢 log 發現沒有 firmware.bin。

```
[root@dywmac ~]# tail /var/log/messages
Sep 21 08:52:18 localhost kernel: facetimehd 0000:02:00.0: VDL set to:
    coarse=0x10008, fine=0x1011a
Sep 21 08:52:18 localhost kernel: facetimehd 0000:02:00.0: Virtual VTT
    enabled
Sep 21 08:52:18 localhost kernel: facetimehd 0000:02:00.0: S2 DRAM
    memory address: 0x22159559
Sep 21 08:52:18 localhost kernel: facetimehd 0000:02:00.0: Rewrite DDR
    mode registers succeeded
Sep 21 08:52:18 localhost kernel: facetimehd 0000:02:00.0: Full memory
    verification succeeded! (0)
Sep 21 08:52:18 localhost kernel: facetimehd 0000:02:00.0: Direct
    firmware load for facetimehd/firmware.bin failed with error -2
Sep 21 08:52:18 localhost kernel: facetimehd 0000:02:00.0: Falling back
    to user helper
Sep 21 08:52:18 localhost kernel: facetimehd: probe of 0000:02:00.0
    failed with error -11
Sep 21 08:52:18 localhost firmware.sh[3287]: Cannot find  firmware file
    'facetimehd/firmware.bin'
Sep 21 08:52:19 localhost pulseaudio[2965]: ratelimit.c: 28 events
    suppressed
```

14. 進入原始碼目錄 /usr/src/bcwc_pcie/firmware，執行 make 進行編譯，出現錯誤。

```
[root@dywmac ~]# cd /usr/src/bcwc_pcie/firmware/
[root@dywmac firmware]# make

Checking dependencies for driver download...
/usr/bin/curl
/usr/bin/xzcat
/bin/cpio

Downloading the driver, please wait...
mv: cannot stat `System/Library/Extensions/AppleCameraInterface.kext
/Contents/MacOS/AppleCameraInterface': No such file or directory
make: *** [AppleCameraInterface] Error 1
```

15. 原因爲 Makefile 中下載檔案出問題。

```
[root@dywmac firmware]#  curl -s -L -r "187085540-191012220" \
"https://support.apple.com/downloads/DL1858/en_US/osxupd10.11.3.dmg" \
| xzcat -q | cpio --format odc -i -d \
"./System/Library/Extensions/AppleCameraInterface.kext/Contents/MacOS/
    AppleCameraInterface"
xzcat: (stdin): Unexpected end of input
cpio: premature end of file
```

23.11 Mac Webcam (WORK)

1. gcc 版本 4.8 編譯失敗，先確定版本 4.4，不是則先降低版本。

```
[root@dywmac bcwc_pcie]# yum downgrade gcc-* libstdc++* cpp libgomp
    libtool
```

2. 上節 facetimehd-firmware 編譯出問題，主要是因原程式以 debian 環境撰寫，且 AppleCameraInterface 檔案下載出問題，改下載非 debian 原始碼。

```
[root@dywmac src]# git clone https://github.com/engstk/bcwc_pcie/
```

3. git clone 下載並自動建立目錄 bcwc_pcie，進入此目錄中的 firmware 次目錄。

```
[root@dywmac src]# cd bcwc_pcie
[root@dywmac bcwc_pcie]# cd firmware/
```

```
[root@dywmac firmware]# ll
total 12
-rwxr-xr-x. 1 root root 8134 Sep 21 10:59 extract-firmware.sh
-rw-r--r--. 1 root root 1148 Sep 21 10:59 Makefile
```

4. 編譯 firmware 時，AppleCameraInterface 檔案下載不成功。

```
[root@dywmac firmware]# make

Checking dependencies for driver download...
/usr/bin/curl
/usr/bin/xzcat
/bin/cpio

Downloading the driver, please wait...
mv: cannot stat `System/Library/Extensions/AppleCameraInterface.kext
/Contents/MacOS/AppleCameraInterface': No such file or directory
make: *** [AppleCameraInterface] Error 1
```

5. 可以將 Macbook 重開機，並選擇 iOS，將 /System/Library/Extensions/AppleCameraInterface.kext/Contents/MacOS/AppleCameraInterface 檔案複製出來，或從我的網站下載。

```
[root@dywmac firmware]# wget http://dywang.csie.cyut.edu.tw/
    AppleCameraInterface
```

6. 在 firmware 目錄下建立次目錄 System/Library/Extensions/AppleCameraInterface.kext/Contents/MacOS/

```
[root@dywmac firmware]# mkdir -p System/Library/Extensions/
    AppleCameraInterface.kext/Contents/MacOS/
```

7. 將 AppleCameraInterface 移至 System/Library/Extensions/AppleCameraInterface.kext/Contents/MacOS/

```
[root@dywmac firmware]# mv AppleCameraInterface \
System/Library/Extensions/AppleCameraInterface.kext/Contents/MacOS/
```

8. 再編譯 firmware，成功執行。

```
[root@dywmac firmware]# make

Checking dependencies for driver download...
/usr/bin/curl
/usr/bin/xzcat
/bin/cpio

Downloading the driver, please wait...


Found matching hash from OS X, El Capitan 10.11.5
==> Extracting firmware...
 --> Decompressing the firmware using gzip...
 --> Deleting temporary files...
 --> Extracted firmware version 1.43.0
```

9. 執行 make install 安裝 firmware。

```
[root@dywmac firmware]# make install
Copying firmware into '//lib/firmware/facetimehd'
```

10. 回到上層目錄編譯 facetimehd 模組，成功執行。

```
[root@dywmac firmware]# cd ..
[root@dywmac bcwc_pcie]# make
make -C /lib/modules/4.4.5-1.el6.elrepo.x86_64/build M=/usr/src/
    bcwc_pcie modules
make[1]: Entering directory `/usr/src/kernels/4.4.5-1.el6.elrepo.x86_64'
  CC [M]  /usr/src/bcwc_pcie/fthd_ddr.o
  CC [M]  /usr/src/bcwc_pcie/fthd_hw.o
  CC [M]  /usr/src/bcwc_pcie/fthd_drv.o
  CC [M]  /usr/src/bcwc_pcie/fthd_ringbuf.o
  CC [M]  /usr/src/bcwc_pcie/fthd_isp.o
/usr/src/bcwc_pcie/fthd_isp.c: In function ‘
    fthd_isp_cmd_channel_camera_config’:
/usr/src/bcwc_pcie/fthd_isp.c:647: warning: ‘ret’ may be used
    uninitialized in this function
  CC [M]  /usr/src/bcwc_pcie/fthd_v4l2.o
  CC [M]  /usr/src/bcwc_pcie/fthd_buffer.o
  CC [M]  /usr/src/bcwc_pcie/fthd_debugfs.o
  LD [M]  /usr/src/bcwc_pcie/facetimehd.o
  Building modules, stage 2.
  MODPOST 1 modules
  CC      /usr/src/bcwc_pcie/facetimehd.mod.o
  LD [M]  /usr/src/bcwc_pcie/facetimehd.ko
make[1]: Leaving directory `/usr/src/kernels/4.4.5-1.el6.elrepo.x86_64'
```

11. 執行 make install 安裝 facetimehd 模組。

```
[root@dywmac bcwc_pcie]# make install
make -C /lib/modules/4.4.5-1.el6.elrepo.x86_64/build M=/usr/src/
    bcwc_pcie modules_install
make[1]: Entering directory `/usr/src/kernels/4.4.5-1.el6.elrepo.x86_64'
  INSTALL /usr/src/bcwc_pcie/facetimehd.ko
  DEPMOD  4.4.5-1.el6.elrepo.x86_64
make[1]: Leaving directory `/usr/src/kernels/4.4.5-1.el6.elrepo.x86_64'
```

12. 成功載入 facetimehd 模組，且可正常使用 webcam。

```
[root@dywmac bcwc_pcie]# depmod
[root@dywmac bcwc_pcie]# modprobe facetimehd
```

23.12 Mac Linux Icons

1. Gcin icons 圖示太小，可下載的圖示最大爲 32x32 還是太小，所以使用 convert 將現有的圖示大小改成 48x48。

```
[root@dywmac ~]# cd /usr/share/icons/gcin
[root@dywmac gcin]# for f in `ls`; do
> convert $f -resize 48x48 $f
> done
[root@dywmac ~]#
```

2. 修改使用的佈景主題 Clearlooks 設定，不能做加大圖示及按鈕等設定，否則 kernel 4.7 很容易檔機。

```
[root@dywmac ~]# cd /usr/share/themes/Clearlooks/gtk-2.0/
[root@dywmac gtk-2.0]# ll
total 24
-rw-r--r--. 1 root root 11630 Aug  4 13:34 gtkrc
-rw-r--r--. 1 root root 11340 Aug  4 12:21 gtkrc.orig
[root@dywmac gtk-2.0]# diff -uN gtkrc.orig gtkrc
--- gtkrc.orig  2016-08-04 13:47:12.874067964 +0800
+++ gtkrc   2016-08-04 13:47:46.608380827 +0800
@@ -1,6 +1,8 @@

 # Please keep this gtkrc in sync with the other ones from Clearlooks
    based themes.
```

```
13 +#gtk-icon-sizes = "panel-menu=48,48:panel=48,48:gtk-menu=32,32:gtk-
       large-toolbar=48,48
   :gtk-small-toolbar=48,48:gtk-button=48,48:panel-applications-menu=48,48
15 :panel-directory-menu=48,48:directorymenu-button=48,48:panel-window-menu
       =32,32"
   +
17  gtk-color-scheme = "base_color:#ffffff\nfg_color:#000000\
        ntooltip_fg_color:#000000
   \nselected_bg_color:#7cd39cec90a8\nselected_fg_color:#ffffff\ntext_color
       :#1A1A1A
19 \nbg_color:#d9d9e147dce2\ntooltip_bg_color:#d5d5dadadede"

21  style "default" {
   @@ -14,24 +16,24 @@
23     GtkButton::child-displacement-y = 1
       GtkButton::default-border = { 0, 0, 0, 0 }
25
   -   GtkCheckButton::indicator-size = 14
27 +   GtkCheckButton::indicator-size = 24

29     GtkEntry::invisible-char = 0x2022

31 -   GtkPaned::handle-size = 6
   +   GtkPaned::handle-size = 16
33
       GtkRange::trough-border = 0
35 -   GtkRange::slider-width = 14
   -   GtkRange::stepper-size = 14
37 +   GtkRange::slider-width = 20
   +   GtkRange::stepper-size = 24
39
       GtkScale::slider-length = 23
41     GtkScale::trough-side-details = 1

43     GtkScrollbar::min-slider-length = 30
       GtkMenuBar::internal-padding = 0
45 -   GtkExpander::expander-size = 16
   +   GtkExpander::expander-size = 26
47     GtkToolbar::internal-padding = 1
   -   GtkTreeView::expander-size = 14
49 +   GtkTreeView::expander-size = 24
       GtkTreeView::vertical-separator = 0
51
       GtkMenu::horizontal-padding = 0
```

23.13 Mac Linux 其他處理項目

1. Touchpad 驅動程式不像原 Mac 支援多種手勢。

2. 開機時有時會卡住，經查爲 iptables 關閉或重啓時有些模組無法成功卸載，設

定 iptables 服務關閉或重啓不必卸載模組後問題解決。

```
[root@dywmac ~]# vim /etc/sysconfig/iptables-config
[root@dywmac ~]# grep IPTABLES_MODULES_UNLOAD /etc/sysconfig/iptables-
    config
IPTABLES_MODULES_UNLOAD="no"
```

3. 目前使用 kernel-ml-4.3.3 版本運作正常，但 HDMI, bluetooth 無法使用。4.4 後的版本雖可使用 HDMI, bluetooth，但 logout 退出圖形面後 gdm 卡住，firefox 有時造成系統死當。原因爲 i915 模組的 HDMI 功能，可以暫時關閉 i915 模組，在 blacklist.conf 關閉 i915 無效，要移除核心 i915 模組，再執行 depmod，重新啓動後系統不再死當，但不能使用 HDMI，鍵盤上的調整螢幕亮度按鈕也無效。

```
[root@dywmac ~]# grep i915 /etc/modprobe.d/blacklist.conf
blacklist i915

[root@dywmac ~]# cd /lib/modules/4.7.0-1.el6.elrepo.x86_64/
[root@dywmac 4.7.0-1.el6.elrepo.x86_64]# vim modules.drm
[root@dywmac 4.7.0-1.el6.elrepo.x86_64]# vim modules.order
[root@dywmac 4.7.0-1.el6.elrepo.x86_64]# grep i915 modules.{drm,order}
modules.drm:#i915.ko
modules.order:#kernel/drivers/gpu/drm/i915/i915.ko
[root@dywmac 4.7.0-1.el6.elrepo.x86_64]# cd kernel/drivers/gpu/drm/i915/
[root@dywmac i915]# mv i915.ko i915.ko.bak
[root@dywmac 4.7.0-1.el6.elrepo.x86_64]# depmod -ae
```

4. 修改 i915 模組開機參數，HDMI 還是有問題，但 kernel 4.4 版本目前測試還沒當機，kernel 4.7 登出登入不會當機，但網頁有時還是會當。

```
[root@dywmac ~]# vim /etc/modprobe.d/i915.conf
[root@dywmac ~]# tail -1 /etc/modprobe.d/i915.conf
options i915 modeset=1 enable_execlists=0
```

5. kernel-ml-firmware 更新到 4.7.3 版，kernel-ml 使用 4.4. 版 HDMI 螢幕可以使用了，但 MAC 主螢幕選單列出現黑螢幕。kernel-ml 使用 4.7.3 開機會出現錯誤訊息且有時會當機。

```
[root@dywmac ~]# dmesg | grep -i error
[drm:fw_domains_get_with_thread_status [i915]] *ERROR* GT thread status
    wait timed out
```

6. kernel-ml 更新到 4.7.5 版，開機還是出現上述 i915 錯誤訊息，以目前的環境重新產生 initramfs 檔，重開機後 i915 錯誤訊息不再出現，而且 hdmi 螢幕也可以用。

```
[root@dywmac ~]# uname -r
4.7.5-1.el6.elrepo.x86_64
[root@dywmac ~]# dracut --force
[root@dywmac ~]# reboot
```

7. 如果設定 i915 開機參數無效，必須設定好之後執行 dracut 重新產生 initramfs 檔才會生效。enable_rc6=0 或 modeset=0 則無 hdmi 螢幕，enable_fbc=0 接 hdmi 螢幕時，mac 主螢幕選單列出現黑幕。

```
[root@dywmac ~]# vim /etc/modprobe.d/i915.conf
[root@dywmac ~]# cat /etc/modprobe.d/i915.conf
options i915 enable_rc6=0 enable_fbc=0
#options i915 modeset=1 enable_execlists=0
[root@dywmac ~]# cat /sys/module/i915/parameters/enable_rc6
1
[root@dywmac ~]# cat /sys/module/i915/parameters/enable_fbc
-1
[root@dywmac ~]# dracut --force
[root@dywmac ~]# reboot
```

8. kernel-ml 更新到 4.8.0 版，HDMI 螢幕可以使用，i915 錯誤訊息不一樣。

```
[root@dywmac ~]# dmesg | grep -i error
[drm:drm_edid_block_valid] *ERROR* EDID checksum is invalid, remainder
    is 202
```

9. kernel-ml 4.8.0 版 i915 開機參數設定爲 modeset=1 enable_execlists=0 沒有 i915 錯誤訊息，不過還是會當機，HDMI 有部分黑幕。

```
[root@dywmac ~]# vim /etc/modprobe.d/i915.conf
[root@dywmac ~]# cat /etc/modprobe.d/i915.conf
options i915 modeset=1 enable_execlists=0
[root@dywmac ~]# dmesg | grep -i error
```

10. kernel-ml 4.8.0 版 i915 開機參數設定爲 modeset=-1 enable_execlists=0 沒有 i915 錯誤訊息，HDMI 沒有黑幕現象，還是會當機。

```
[root@dywmac ~]# vim /etc/modprobe.d/i915.conf
[root@dywmac ~]# cat /etc/modprobe.d/i915.conf
options i915 modeset=-1 enable_execlists=0
[root@dywmac ~]# dmesg | grep -i error
[root@dywmac ~]# dracut --force
[root@dywmac ~]# reboot
[root@dywmac ~]# cat /sys/module/i915/parameters/modeset
-1
```

11. kernel-ml 4.8.1 版 i915 沒有 i915 錯誤訊息，HDMI 也沒有黑幕現象，但還是會當機。

```
[root@dywmac ~]# uname -r
4.8.1-1.el6.elrepo.x86_64
[root@dywmac ~]# dmesg | grep -i error
[root@dywmac ~]# cat /sys/module/i915/parameters/modeset
-2
```

12. kernel-ml 4.8.2 版 i915 沒有 i915 錯誤訊息，HDMI 也沒有黑幕現象，以下列 i915 參數開機沒當機，繼續觀察中。

```
[root@dywmac ~]# grep enable_rc6 /boot/efi/EFI/redhat/grub.conf
    kernel /vmlinuz-4.8.2-1.el6.elrepo.x86_64 ............ \
    i915.modeset=-1 i915.enable_rc6=0

[root@dywmac ~]# cat /sys/module/i915/parameters/lvds_channel_mode
0
[root@dywmac ~]# cat /sys/module/i915/parameters/lvds_use_ssc
-1
[root@dywmac ~]# cat /sys/module/i915/parameters/enable_rc6
0
[root@dywmac ~]# cat /sys/module/i915/parameters/modeset
-1
```

13. kernel-ml-firmware 4.8.3 版，HDMI 反而不穩定，最後採用 `kernel-ml-firmware-4.8.2-1.el6.elrepo.noarch`，不論 kernel-ml 是 4.8.3, 4.8.2 或 4.4.5 都可正常使用，但 kernel-ml 4.8 比較耗電，所以目前使用 `kernel-ml-4.4.5-1.el6.elrepo.x86_64` 且 i915 使用以下參數：

```
[root@dywmac ~]# cat /sys/module/i915/parameters/enable_execlists
0
[root@dywmac ~]# cat /sys/module/i915/parameters/modeset
1
```

```
[root@dywmac ~]# cat /sys/module/i915/parameters/lvds_channel_mode
0
[root@dywmac ~]# cat /sys/module/i915/parameters/lvds_use_ssc
-1
[root@dywmac ~]# cat /sys/module/i915/parameters/enable_rc6
1
```

14. 使用 kernel-ml-4.4.5-1 kernl-ml-firmware-4.4.5-1，開機核心設定 intel_iommu=off，螢幕顯示正常，改變螢幕解析度，登出登入圖形界面，HDMI 雙螢幕的功能都可正常使用。

```
[root@dywmac ~]# grep intel /boot/efi/EFI/redhat/grub.conf
    kernel /vmlinuz-4.4.5-1.el6.elrepo.x86_64 ro ..... intel_iommu=off
```

Chapter 24

MSI PS42 + DYW Linux

24.1 安裝

1. 目的：在 MSI PS42 安裝客製化 DYW Linux 系統。
2. MSI PS42 BIOS 沒有 PXE 安裝選項。
3. BIOS 開閉 Secure boot，使用隨身碟開機。
4. 硬碟分割格式爲 UEFI/GPT，使用 gdisk 進行分割，必須要有 EF00 的 EFI System 分割區，才能以 UEFI 開機。

```
[root@dywmsi ~]# gdisk /dev/nvme0n1
GPT fdisk (gdisk) version 0.8.10

Partition table scan:
  MBR: protective
  BSD: not present
  APM: not present
  GPT: present

Found valid GPT with protective MBR; using GPT.

Command (? for help): p
Disk /dev/nvme0n1: 1000215216 sectors, 476.9 GiB
Logical sector size: 512 bytes
Disk identifier (GUID): C4922C32-FCB9-4A8E-8DC4-0D5C6A655F7B
Partition table holds up to 128 entries
First usable sector is 34, last usable sector is 1000215182
Partitions will be aligned on 2048-sector boundaries
Total free space is 53334637 sectors (25.4 GiB)

Number  Start (sector)    End (sector)  Size       Code  Name
   1            2048           43007   20.0 MiB    EF00  EFI System
   2           43008         1067007   500.0 MiB   EF02  BIOS boot
       partition
   3         1067008       944785407   450.0 GiB   8E00  Linux LVM
```

```
Command (? for help): q
```

5. 分割規劃如下：

```
[root@dywmsi ~]# lsblk
NAME                  MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
nvme0n1               259:0    0  477G  0 disk
  nvme0n1p3           259:3    0  450G  0 part
    vgmsi-swap (dm-1) 253:1    0    8G  0 lvm  [SWAP]
    vgmsi-home (dm-2) 253:2    0  140G  0 lvm  /home
    vgmsi-root (dm-0) 253:0    0  120G  0 lvm  /
    vgmsi-pub (dm-3)  253:3    0  100G  0 lvm  /var/ftp/pub
  nvme0n1p1           259:1    0   20M  0 part /boot/efi
  nvme0n1p2           259:2    0  500M  0 part /boot
```

6. UEFI 開機檔案系統根目錄必須有 EFI/BOOT 目錄，而且目錄下必須有 EFI 開機檔 BOOTX64.efi，及 BOOTX64.conf grub 開機選單檔。

```
[root@dywmsi ~]# ll /boot/efi/EFI/BOOT/
total 504
-rwxr-xr-x. 1 root root   3522 Jun 10 11:10 BOOTX64.conf
-rwxr-xr-x. 1 root root 253736 Jun 10 07:07 BOOTX64.efi
```

7. 使用複製檔案系統 cp -ax 方式進行安裝，在複製完成後必須 chroot 到新系統，並在根目錄上產生空檔案 .autorelabel 。

```
[root@deyu ~]# chroot /mnt/root
[root@dywmsi ~]# touch /.autorelabel
```

8. 使用複製檔案方式安裝，第一次開機必須進入單人維修模式，系統讀到根目錄的.autorelabel 會進行檔案的 selinux context 重設定，才能正常開機。

24.2 Wifi

1. 查詢開機資訊 iwlwifi-9000-pu-b0-jf-b0-xx.ucode firmare 不存在。

```
[root@dywmsi ~]# dmesg | grep wifi
iwlwifi 0000:00:14.3: enabling device (0000 -> 0002)
```

```
iwlwifi 0000:00:14.3: Direct firmware load for iwlwifi-9000-pu-b0-jf-b0
    -36.ucode failed with error -2
iwlwifi 0000:00:14.3: Direct firmware load for iwlwifi-9000-pu-b0-jf-b0
    -35.ucode failed with error -2
iwlwifi 0000:00:14.3: Direct firmware load for iwlwifi-9000-pu-b0-jf-b0
    -34.ucode failed with error -2
iwlwifi 0000:00:14.3: Direct firmware load for iwlwifi-9000-pu-b0-jf-b0
    -33.ucode failed with error -2
iwlwifi 0000:00:14.3: Direct firmware load for iwlwifi-9000-pu-b0-jf-b0
    -32.ucode failed with error -2
iwlwifi 0000:00:14.3: Direct firmware load for iwlwifi-9000-pu-b0-jf-b0
    -31.ucode failed with error -2
iwlwifi 0000:00:14.3: Direct firmware load for iwlwifi-9000-pu-b0-jf-b0
    -30.ucode failed with error -2
iwlwifi 0000:00:14.3: no suitable firmware found!
iwlwifi 0000:00:14.3: minimum version required: iwlwifi-9000-pu-b0-jf-b0
    -30
iwlwifi 0000:00:14.3: maximum version supported: iwlwifi-9000-pu-b0-jf-
    b0-36
iwlwifi 0000:00:14.3: check git://git.kernel.org/pub/scm/linux/kernel/
    git/firmware/linux-firmware.git
```

2. 下載 Intel® Wireless-AC 9560 fimware，網頁上說明此 firmware 必須使用 4.14 以上版本 kernel。

```
[root@dywmsi ~]# wget https://wireless.wiki.kernel.org/_media/en/users/
    drivers/\
iwlwifi-9000-pu-b0-jf-b0-34.618819.0.tgz
```

3. 解打包壓縮。

```
[root@dywmsi ~]# tar zxvf iwlwifi-9000-pu-b0-jf-b0-34.618819.0.tgz
iwlwifi-9000-pu-b0-jf-b0-34.618819.0/
iwlwifi-9000-pu-b0-jf-b0-34.618819.0/iwlwifi-9000-pu-b0-jf-b0-34.ucode
iwlwifi-9000-pu-b0-jf-b0-34.618819.0/LICENSE.iwlwifi-9000.ucode
iwlwifi-9000-pu-b0-jf-b0-34.618819.0/README.iwlwifi-9000.ucode
```

4. 將 firmware 複製到 /lib/firmware。

```
[root@dywmsi ~]# cp iwlwifi-9000-pu-b0-jf-b0-34.618819.0/\
iwlwifi-9000-pu-b0-jf-b0-34.ucode /lib/firmware/
```

5. 重開機後再查詢開機 wifi 訊息。

```
[root@dywmsi ~]# dmesg | grep wifi
iwlwifi 0000:00:14.3: enabling device (0000 -> 0002)
iwlwifi 0000:00:14.3: loaded firmware version 34.0.0 op_mode iwlmvm
iwlwifi 0000:00:14.3: Detected Intel(R) Dual Band Wireless AC 9560, REV
    =0x318
iwlwifi 0000:00:14.3: base HW address: 04:ea:56:e1:e3:67
iwlwifi 0000:00:14.3 wlan0: disabling HT/VHT due to WEP/TKIP use
```

24.3 Bluetooth

1. 查詢開機資訊 ibt-xxx.sfi 及 ibt-xxx.ddc firmare 不存在。

```
[root@dywmsi ~]# dmesg | grep failed
.....
```

2. 建立 /lib/firmware/intel 目錄，並進入此工作目錄。

```
[root@dywmsi ~]# mkdir /lib/firmware/
[root@dywmsi ~]# cd /lib/firmware/
[root@dywmsi firmware]#
```

3. 下載 linux-firmware/intel fimware

```
[root@dywmsi firmware]# wget https://github.com/wkennington/linux-
    firmware/blob/master/intel/ibt-17-16-1.sfi
[root@dywmsi firmware]# wget https://github.com/wkennington/linux-
    firmware/blob/master/intel/ibt-17-16-1.ddc
```

24.4 桌面調整

1. 解析度 1920X1080，設定 gnome 顯示 Resolution 爲 120 dots per inch 及字型大小，使用的字型可以統一於.fonts.conf 進行取代。

```
system --> Preference --> Appearance --> Fonts --> Detials

Resolution: 120 dots per inch
```

2. Firefox menu 及網址列 icon size 增大 120%：

```
(1) Type abbout:config in the address bar and press Enter.
(2) In the filter box, type or paste pix and pause while the list is
   filtered
(3) Double-click layout.css.devPixelsPerPx and try changing its value to
    1.2
```

3. 高解析度顯示，改用 Noto 字型並對所有字型預設開 antialias，關 hinting，hintstyle 爲 hintslight，字型不會鋸齒狀且不會模糊。

```
[root@dywmsi ~]# cat /home/dywang/.fonts.conf
<?xml version="1.0"?>
<!DOCTYPE fontconfig SYSTEM "fonts.dtd">

<fontconfig>
<!--爲不帶粗體的宋明楷體合成粗體。-->
<match target="font">
        <test name="family" compare="contains">
                <string>宋</string>
                <string>明</string>
                <string>楷</string>
                <string>Song</string>
                <string>Sun</string>
                <string>Ming</string>
                <string>Kai</string>
        </test>
        <test compare="more_eq" target="pattern" name="weight">
                <int>180</int>
        </test>
        <edit mode="assign" name="embolden">
                <bool>false</bool>
        </edit>
</match>

<!-- 解決中文字體英文間距過寬 -->
<match target="font">
        <test target="pattern" name="lang" compare="contains">
                <string>zh</string>
                <string>ja</string>
                <string>ko</string>
        </test>
        <test name="spacing" compare="eq">
                <const>dual</const>
        </test>
        <edit name="spacing">
                <const>proportional</const>
        </edit>
        <edit name="globaladvance">
                <bool>false</bool>
        </edit>
```

```
41 </match>

43 <alias>
        <family>微軟正黑體</family>
45      <family>黑体</family>
        <family>細明體</family>
47      <family>新細明體</family>
        <family>sans-serif</family>
49      <prefer>
                <family>Noto Sans CJK TC Regular</family>
51      </prefer>
</alias>
53
<alias>
55      <family>標楷體</family>
        <prefer>
57              <family>Noto Sans CJK TC Regular</family>
        </prefer>
59 </alias>
<!--適應正體中文用户的用字習慣，可依個人喜好修改。-->
61 <alias>
        <family>serif</family>
63      <prefer>
                <family>Noto Sans CJK TC Regular</family>
65              <family>DejaVu Serif</family>
                <family>DejaVu Sans</family>
67              <family>DejaVu Sans Mono</family>
                <family>AR PL UMing TW</family>
69              <family>AR PL UMing CN</family>
        </prefer>
71 </alias>

73 <alias>
        <family>Sans</family>
75      <prefer>
                <family>Noto Sans CJK TC Regular</family>
77              <family>DejaVu Sans</family>
                <family>DejaVu Serif</family>
79              <family>DejaVu Sans Mono</family>
                <family>AR PL UMing TW</family>
81              <family>AR PL UMing CN</family>
        </prefer>
83 </alias>
<alias>
85      <family>Sans-serif</family>
        <prefer>
87              <family>Noto Sans CJK TC Regular</family>
                <family>DejaVu Sans</family>
89              <family>DejaVu Serif</family>
                <family>DejaVu Sans Mono</family>
91              <family>AR PL UMing TW</family>
                <family>AR PL UMing CN</family>
93      </prefer>
</alias>
```

```
95
<alias>
97          <family>Monospace</family>
            <prefer>
99                  <family>DejaVu Sans Mono</family>
                    <family>Noto Sans CJK TC Regular</family>
101                 <family>DejaVu Sans</family>
                    <family>DejaVu Serif</family>
103                 <family>AR PL UMing TW</family>
                    <family>AR PL UMing CN</family>
105         </prefer>
</alias>
107 <!--所有字型預設開AA開hinting-->
<match target="font">
109         <edit name="antialias" mode="assign"><bool>true</bool></edit>
            <edit name="hinting" mode="assign"><bool>false</bool></edit>
111         <edit name="autohint" mode="assign"><bool>false</bool></edit>
            <edit name="hintstyle" mode="assign"><const>hintslight</const></
                edit>
113 </match>
</fontconfig>
```

4. gdm 登入畫面字型大小調整，先備份 gdm-simple-slave，這個檔案是二進位可執行檔，改錯則無法執行。取代字串 verbose 爲 dpi 120，數字 120 是三個字元，若要改成 96，則 96 後面要加一個空白字元。

```
[root@dywmsi ~]# cp /usr/libexec/gdm-simple-slave /tmp/
2 [root@dywmsi ~]# sed 's/verbose/dpi 120/g' -i /usr/libexec/gdm-simple-
    slave
```

24.5 Console Font Size

1. 螢幕解析度度爲 1920X1080，文字模式的終端機字很小不好操作。修改開機核心使用 ter-224n 字型取代原有的 latarcyrheb-sun16 字型。

```
[root@dywmsi ~]# vim /boot/efi/EFI/BOOT/BOOTX64.conf
2 [root@dywmsi ~]# grep tern /boot/efi/EFI/BOOT/BOOTX64.conf
    kernel /vmlinuz-..... SYSFONT=ter-224n ........ quiet
```

2. 開機及終端機系統字型於開機核心參數設定無效，在 i18n 設定使用 ter-224n 24 點字型。

```
[root@dywmsi ~]# vim /etc/sysconfig/i18n
[root@dywmsi ~]# cat /etc/sysconfig/i18n
LANG="en_US.UTF-8"
#SYSFONT="latarcyrheb-sun16"
SYSFONT="ter-224n"
```

24.6 開機及圖形界面問題

1. 開機時 kernel 偵測到內顯，但 mode 是 800x600x32。kernel 4.15 以下版本可以進入圖形界面，但解析度只有 800x600。kernel 4.16 以上版本解析度正常 1920x1080 但無法進入圖形界面。

```
[root@dywmsi ~]# dmesg grep ^efi
efi: EFI v2.70 by American Megatrends
efi:  ACPI 2.0=0x894c1000  ACPI=0x894c1000  SMBIOS=0x8a9bc000  SMBIOS
    3.0=0x8a9bb000  MEMATTR=0x8267d418  ESRT=0x83ffbf98
efifb: probing for efifb
efifb: framebuffer at 0x90000000, using 1876k, total 1875k
efifb: mode is 800x600x32, linelength=3200, pages=1
efifb: scrolling: redraw
efifb: Truecolor: size=8:8:8:8, shift=24:16:8:0
```

2. 若開機時按 F11 進入開機選單選擇開機項目，則不會再偵測內顯。kernel 4.15 以下版本可以進入圖形界面，但解析度只能是 1920x1080，無法調整。kernel 4.16 以上版本解析度正常 1920x1080 但依然無法進入圖形界面。

```
[root@dywmsi ~]# dmesg | grep ^efi
efi: EFI v2.70 by American Megatrends
efi:  ACPI 2.0=0x894c1000  ACPI=0x894c1000  SMBIOS=0x8a9bc000  SMBIOS
    3.0=0x8a9bb000  MEMATTR=0x82640018  ESRT=0x82649f98
```

3. 原因爲開機核心載入參數 i915.modeset=0 停用 KMS (Kernel mode setting) 時，可以進入圖形界面，kernel 4.16 以上版本開機核心載入 i915.modeset=0 一樣可以進入圖形界面，但沒有 HDMI 訊號且無法調整螢幕解析度及亮度。

```
[root@dywmsi ~]# ll /sys/class/backlight/
total 0
[dywang@dywmsi ~]#  xrandr
xrandr: failed to get size of gamma for output default
```

```
5 Screen 0: minimum 1920 x 1080, current 1920 x 1080, maximum 1920 x 1080
  default connected primary 1920x1080+0+0 0mm x 0mm
7    1920x1080       0.0*
```

24.7 新增勒體

1. 下載 linux firmware

```
1 [dywang@dywmsi Downloads]$ ll linux-firmware-master.zip
  -rw-rw-r--. 1 dywang dywang 187713770 Jun 11 11:16 linux-firmware-master
      .zip
3 [dywang@dywmsi Downloads]$ unzip linux-firmware-master
```

2. 將解壓縮 linux-firmware-master 目錄中的 i915 複製到 /lib/firmware。

```
1 [root@dywmsi ~]# cp -a /home/dywang/Downloads/linux-firmware-master/i915
      /lib/firmware/
```

3. 目前的核心版本爲 4.18.20-1。

```
1 [root@dywmsi ~]# uname -r
  4.18.20-1.el6.elrepo.x86_64
```

4. 開機核心參數維持 i915.modeset=1。

```
  [root@dywmsi ~]# grep 4.18.20 /boot/efi/EFI/BOOT/BOOTX64.conf
2 title Red Hat Linux (4.18.20-1.el6.elrepo.x86_64)
      kernel /vmlinuz-4.18.20-1.el6.elrepo.x86_64 .......
4 i915.modeset=1 acpi_osi=linux i915.alpha_support=Y
      initrd /initramfs-4.18.20-1.el6.elrepo.x86_64.img
```

5. 重新產生核心版本 4.18.20-1 的 initramfs。

```
1 [root@dywmsi ~]# dracut -f
```

6. 重新開機。

```
[root@dywmsi ~]# reboot
```

24.8 圖形界面螢幕解析度

1. 以新產生核心版本 4.18.20-1 的 initramfs，且核心參數維持 i915.modeset=1 開機。但依然無法進入圖形界面，必須新增 xorg 設定 Driver 爲 modesetting。

```
[root@dywmsi ~]# vim /etc/X11/xorg.conf.d/20-displaylink.conf
[root@dywmsi ~]# cat /etc/X11/xorg.conf.d/20-displaylink.conf
Section "Device"
    Identifier  "DisplayLink"
    Driver      "modesetting"
    Option      "AccelMethod" "none"
EndSection
```

2. 成功進入圖形界面。

```
[dywang@dywmsi ~]$ startx
```

3. 進入圖形界面後，螢幕解析度也可調整了，HDMI 也沒問題。

```
[dywang@dywmsi ~]$ xrandr
Screen 0: minimum 320 x 200, current 3840 x 1080, maximum 8192 x 8192
eDP-0 connected 1920x1080+0+0 (normal left inverted right x axis y axis)
     309mm x 173mm
   1920x1080     60.01*+
   1400x1050     59.98
   1280x1024     60.02
   1280x960      60.00
   1024x768      60.04    60.00
   960x720       60.00
   928x696       60.05
   896x672       60.01
   800x600       60.00    60.32    56.25
   700x525       59.98
   640x512       60.02
   640x480       60.00    59.94
   512x384       60.00
   400x300       60.32    56.34
   320x240       60.05
HDMI-0 disconnected (normal left inverted right x axis y axis)
```

```
  1920x1080 (0x297) 148.500MHz
21        h: width  1920 start 2008 end 2052 total 2200 skew    0 clock
              67.50KHz
          v: height 1080 start 1084 end 1089 total 1125           clock
              60.00Hz
```

24.9 螢幕亮度

1. 以新產生核心版本 4.18.20-1 的 initramfs，且核心參數維持 i915.modeset=1 開機，螢幕亮度已可調整，預設是最大亮度 120000。

```
[root@dywmsi ~]# cat /sys/class/backlight/intel_backlight/brightness
2 120000
```

2. 開機執行的第一支腳本最前面，設定螢幕爲較低的亮度 4000。

```
[root@dywmsi ~]# vim /etc/rc.d/rc.sysinit
2 [root@dywmsi ~]# egrep -v '^(#|$)' /etc/rc.d/rc.sysinit | head -1
echo 4000 >  /sys/class/backlight/intel_backlight/brightness
```

3. 由於 Xorg 是以 modesetting Driver 進入圖形界面，所有無法使用 xbacklight 調整亮度。

```
1 [dywang@dywmsi ~]$ xbacklight -get
No outputs have backlight property
```

4. 調整螢幕亮度可以使用 xrandr，先查詢顯示名稱爲 eDP-0。

```
[dywang@dywmsi ~]$ xrandr | head -2
2 Screen 0: minimum 320 x 200, current 1920 x 1080, maximum 8192 x 8192
eDP-0 connected 1920x1080+0+0 (normal left inverted right x axis y axis)
     309mm x 173mm
```

5. 使用 xrandr 調整亮度，最後數字爲原亮度的「乘數」，可以是浮點數。

```
1 [dywang@dywmsi ~]$ xrandr --output eDP-0 --brightness 0.5
[dywang@dywmsi ~]$ xrandr --output eDP-0 --brightness 1
```

24.10 螢幕亮度快速鍵

1. MSI PS 42 鍵 Fn+Up 增加亮度，Fn+Down 降低亮度，Fn+Up 不但無法工作，而且 Fn+Down 一按就降低亮度到全黑，即使再按 Fn+Up 也無法叫醒。查看 /var/log/messages Fn+Up (e078), Fn+Down (e077) keycodes 沒有對應。

```
[root@dywmsi ~]# tail -4 /var/log/messages
Jun 13 06:42:26 dywmsi kernel: atkbd serio0: Unknown key released (
    translated set 2, code 0xf7 on isa0060/serio0).
Jun 13 06:42:26 dywmsi kernel: atkbd serio0: Use 'setkeycodes e077 <
    keycode>' to make it known.
Jun 13 06:42:27 dywmsi kernel: atkbd serio0: Unknown key released (
    translated set 2, code 0xf8 on isa0060/serio0).
Jun 13 06:42:27 dywmsi kernel: atkbd serio0: Use 'setkeycodes e078 <
    keycode>' to make it known.
```

2. xmodmap 查詢有關 brightness 的 keycodes。

```
[root@dywmsi ~]# xmodmap -pke | grep -i bright
keycode 232 = XF86MonBrightnessDown NoSymbol XF86MonBrightnessDown
keycode 233 = XF86MonBrightnessUp NoSymbol XF86MonBrightnessUp
keycode 237 = XF86KbdBrightnessDown NoSymbol XF86KbdBrightnessDown
keycode 238 = XF86KbdBrightnessUp NoSymbol XF86KbdBrightnessUp
```

3. 設定 Fn+Up (e078) 的 keycode 233，Fn+Down (e077) keycode 232。

```
[root@dywmsi ~]# setkeycodes e078 233
[root@dywmsi ~]# setkeycodes e077 232
```

4. 將 Fn+Up 及 Fn+Down 寫入開機執行腳本 rc.local，雖然測試結果還是無效，但不會再產生錯誤訊息。

```
[root@dywmsi ~]# vim /etc/rc.d/rc.local
[root@dywmsi ~]# tail -2 /etc/rc.d/rc.local
setkeycodes e078 233
setkeycodes e077 232
```

5. 由於 Xorg 使用的 Driver 是 modesetting，不是 Intel，調整亮度的 xbacklight 無法使用。要使用 xrandr 調整亮度，其參數必須隨亮度大小改變，無法

固定。因此，自行撰寫腳本 xbacklight.sh 放在 /usr/bin，以目前亮度固定增減比率做調整：

```
[root@dywmsi ~]# cat /usr/bin/xbacklight.sh
#!/bin/bash
max=$(cat /sys/class/backlight/intel_backlight/max_brightness)
actual=$(cat /sys/class/backlight/intel_backlight/actual_brightness)
[[ $1 =~ inc ]] && brightness=$((actual*2))
[[ $1 =~ dec ]] && brightness=$((actual/2))
[[ $brightness -gt $max ]] && brightness=$max
[[ $brightness -le 0 ]] && brightness=1
sudo sh -c "echo $brightness > /sys/class/backlight/intel_backlight/
    brightness"
```

6. 圖形界面自訂 Fn+Up 及 Fn+Down 快速鍵，執行 xbacklight.sh。

```
System -> Preference -> Keyboard Shortcuts
Add
Custom Shortcuts
BrightnessUp XF86KbdBrightnessUp NoSymbol XF86KbdBrightnessUp
BrightnessDown XF86KbdBrightnessDown NoSymbol XF86KbdBrightnessDown
```

7. BrightnessUp 及 BrightnessDown 的執行命令分別爲：

```
BrightnessUp:  /usr/bin/xbacklight.sh inc
BrightnessDown:  /usr/bin/xbacklight.sh dec
```

24.11 Fingerprint 指紋辨識

1. 安裝指紋辨識工具。

```
[root@dywmsi ~]# yum install fprintd-pam fprintd
```

2. 啓動指紋辨識認證。

```
[root@dywmsi ~]# authconfig --enablefingerprint --update
```

3. 加入指紋辨識用户，回應沒有指紋辨識裝置。

```
[root@dywmsi ~]# fprintd-enroll
list_devices failed: No devices available
```

4. lsusb 查詢到 Device 003 ... 06cb:009b Synaptics 是指紋辨識裝置。

```
[root@dywmsi ~]# lsusb
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 001 Device 002: ID 0bda:0129 Realtek Semiconductor Corp. RTS5129
    Card Reader Controller
Bus 001 Device 004: ID 8087:0aaa Intel Corp.
Bus 002 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 001 Device 003: ID 06cb:009b Synaptics, Inc.
```

5. 沒有 06cb:009b Synaptics 指紋辨識裝置的 driver，所以無法驅動。

Chapter 25

其他

25.1 Whyteboard 白板套件

1. Whyteboard 爲 pdf 檔白板套件。
2. Whyteboard 可在 pdf 檔進行畫線、矩形、橢圓、多邊形、圓及寫字等。
3. Whyteboard 畫的物件可以移動、改變大小及顏色。
4. 下載套件

```
[root@dyH ~]# wget http://code.google.com/p/whyteboard/downloads/detail?
    name=whyteboard-0.41.1.rpm
```

5. 此套件已加到 DYW Linux repo 套件庫中，故只要建立 repo 套件設定，就可以使用 yum 來安裝。

```
1 [root@dywH ~]# grep dywang.*centos6 /etc/yum.repos.d/dywang.repo
[dywang]
3 name=De-Yu Wang
baseurl=http://dywang.csie.cyut.edu.tw/centos6/
5 gpgcheck=0
enabled=1
```

6. 以 yum 安裝 whyteboard

```
[root@dyH ~]# yum install whyteboard
```

7. 使用一般帳號執行時出現找不到 wxversion 模組的錯誤訊息。

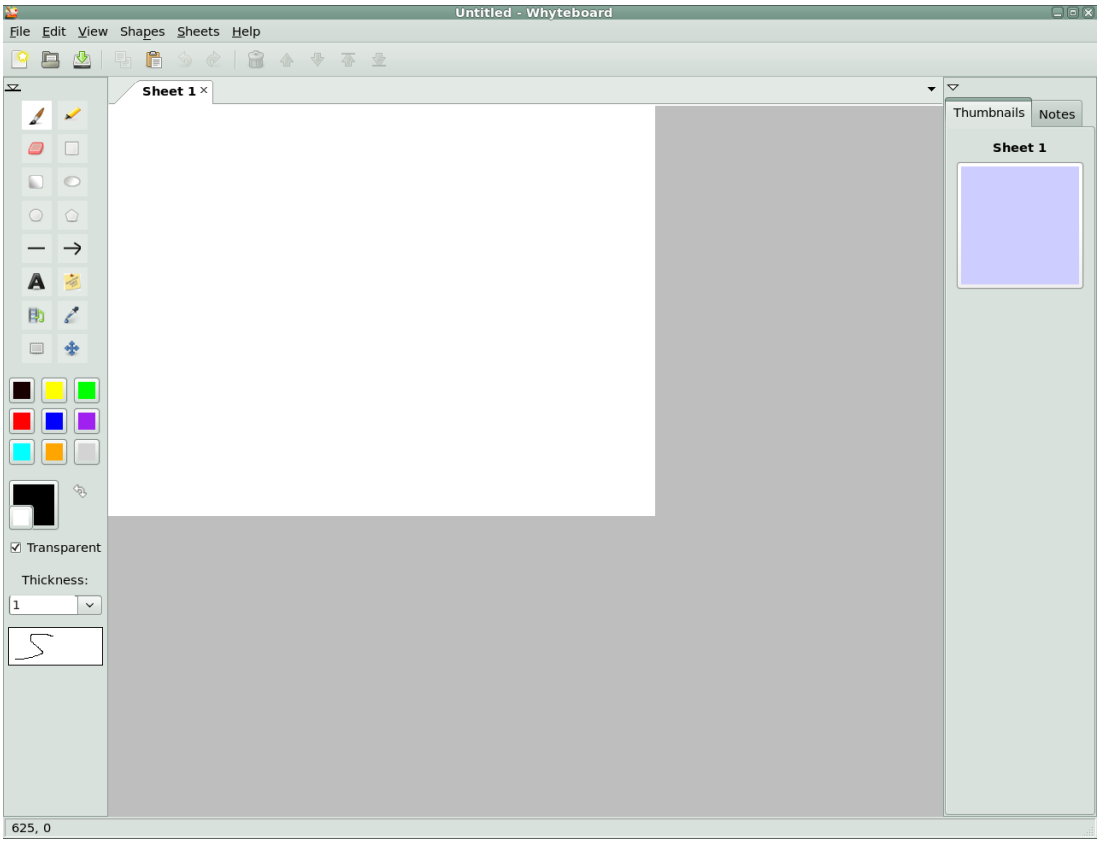
```
[dywang@dywH base]$ whyteboard
Traceback (most recent call last):
  File "/usr/bin/whyteboard", line 34, in <module>
    import wxversion
ImportError: No module named wxversion
```

8. 安裝 wxPython 套件

```
[root@dywH ~]# yum install wxPython
```

9. 執行 whyteboard

```
[dywang@dywH ~]$ whyteboard
```



25.2 gdm 登入問題

1. gdm 更新後登入時畫面卡住，解決問題過程嘗試關閉 selinux 後正常，因此確定問題與 selinux 有關，先暫時關閉 selinux。

```
[root@dyH ~]# setenforce 0
```

2. 清空 selinux 審查紀錄檔，重新啓動 auditd 服務。

```
[root@dyH ~]# echo '' > /var/log/audit/audit.log
[root@dyH ~]# /etc/init.d/auditd restart
```

3. gdm 畫面成功登入後，查詢審查紀錄檔發現以下訊息，表示無權限執行 NetworkManager。

```
[root@dywH ~]# grep NetworkManager -m1 /var/log/audit/audit.log
type=AVC msg=audit(1442193110.952:767): avc:  denied  { execute } \
for  pid=13306 comm="Default" name="NetworkManager" dev=dm-0 \
ino=2753498 scontext=system_u:system_r:xdm_t:s0-s0:c0.c1023 \
tcontext=system_u:object_r:initrc_exec_t:s0 tclass=file
```

4. 經查爲舊版系統中，登入圖形界面後 NetworkManager 有時無法正常工作，因此於 gdm 登入後預設檔中加入重新啓動 NetworkManager 的命令。

```
[root@dywH ~]# cat /etc/gdm/PostLogin/Default
#!/bin/sh
/etc/init.d/NetworkManager restart
exit 0
```

5. 刪除重啓 NetworkManager 命令後正常。

```
[root@dywH ~]# cat /etc/gdm/PostLogin/Default
#!/bin/sh

exit 0
```

25.3 ASUS 筆電 WIFI 問題

1. 開機後看不到無線網卡，rfkill 列出所有無線裝置，出現 phy0 及 acer-wireless。

```
[dywang@deyu ~]$ su -
Password:
[root@deyu ~]# rfkill list all
0: phy0: Wireless LAN
    Soft blocked: no
    Hard blocked: no
1: acer-wireless: Wireless LAN
    Soft blocked: yes
    Hard blocked: no
```

2. lspci 查看網路設備，kernel 使用的驅動程式是 ath9k。

```
[root@deyu ~]# lspci -nnk | grep -A2 0280
03:00.0 Network controller [0280]: Qualcomm Atheros QCA9565 / AR9565
    Wireless Network Adapter [168c:0036] (rev 01)
    Subsystem: AzureWave Device [1a3b:2130]
    Kernel driver in use: ath9k
```

3. lsmod 查看核心載入的模組，有 acer_wmi，但這是 ASUS 筆電，不是 ACER 筆電，表示核心多了 ACER 無線模組。

```
[root@deyu ~]# lsmod | grep -e ath9k -e asus
asus_nb_wmi            24576  0
asus_wmi               28672  1 asus_nb_wmi
sparse_keymap          16384  2 acer_wmi,asus_wmi
ath9k                 139264  0
mac80211              749568  1 ath9k
ath9k_common           40960  1 ath9k
ath9k_hw              507904  2 ath9k,ath9k_common
ath                    32768  3 ath9k,ath9k_common,ath9k_hw
cfg80211              557056  4 ath9k,mac80211,ath9k_common,ath
rfkill                 28672  4 acer_wmi,asus_wmi,cfg80211,bluetooth
asus_wireless          16384  0
hwmon                  16384  3 asus_wmi,coretemp,nouveau
wmi                    16384  4 acer_wmi,asus_wmi,nouveau,mxm_wmi
video                  40960  4 acer_wmi,asus_wmi,nouveau,i915
```

4. 移除 acer-wmi 模組後，無線網卡正常運作。

```
[root@deyu ~]# modprobe -r acer-wmi
```

5. 如果要開機不載入 acer-wmi 模組，可在不載入清單 blacklist.conf 中增加。

```
[root@deyu ~]# vim /etc/modprobe.d/blacklist.conf
[root@deyu ~]# tail -1 /etc/modprobe.d/blacklist.conf
blacklist acer_wmi
```

25.4 HDMI 顯示問題

1. HDMI 雙螢幕使用正常，但接不同的 HDMI 螢幕後，出現無訊號狀況。
2. 解決方式：刪除家目錄中的.config 目錄。

```
[dywang@deyu ~]$ rm -rf .config
```

25.5 Acer Aspire 15E Wifi

1. kernel 必須先更新到 4.9 以上，才支援 ath10k。

```
[root@deyu ~]$ yum install kernel-ml --enablerepo=kernel
```

2. 重新開機。

```
[root@deyu ~]# reboot
```

3. 開機後，查詢 kernel 版本 4.18.19。

```
[root@deyu ~]# uname -r
4.18.19-1.el6.elrepo.x86_64
```

4. 下載 ath10k firmware。

```
[root@deyu ~]# cd /usr/src/
[root@deyu src]# git clone https://github.com/kvalo/ath10k-firmware.git
```

5. 建立 /lib/firmware/ath10k/QCA9377/ 目錄。

```
[root@deyu src]# mkdir -p /lib/firmware/ath10k/QCA9377/
```

6. 將 clone 的 ath10k-firmware/QCA9377/hw1.0 複製到 /lib/firmware/ath10k/QCA9377/。

```
[root@deyu src]# cd ath10k-firmware/QCA9377/hw1.0
[root@deyu src]# cp * /lib/firmware/ath10k/QCA9377/hw1.0
```

7. 切換到 /lib/firmware/ath10k/QCA9377/hw1.0，將 firmware-5.bin_WLAN.... 移到 hw1.0 目錄下且更名爲 firmware-5.bin。

```
[root@deyu src]# cd /lib/firamware/ath10k/QCA9377/hw1.0
[root@deyu src]# mv WLAN.TF.1.0/firmware-5.bin_WLAN.TF.1.0-00002-
    QCATFSWPZ-5 firmware-5.bin
```

25.6 Gnome Weather Icon

1. Gnome 工具列顯示時間的 Icon，因 The National Oceanic and Atmospheric Administration of the United States (NOAA)，不再提供資料，所以無法天氣訊息。

2. 解決方式：CentOS 6 已有 rpm 修補套件。，改由 www.aviationweather.gov 網站提供氣象資料，但網站存取格式變更後就又無法取得氣象資料，所以自行編譯打包 libgweather-2.28.0-6.el6.dyw rpm 套件

3. libsoup 函式庫套件更新

```
[dywang@deyu ~]$ yum update libsoup
[root@deyu ~]# rpm -qa | grep libsoup
libsoup-2.34.3-5.el6.x86_64
```

25.7 問題解決

1. 問題一：libc.so.6 連結到非 yum 安裝的版本。

```
[root@dywftp lib64]# ls
ls: relocation error: /usr/lib64/libc.so.6: symbol _dl_starting_up,
    version
GLIBC_PRIVATE not defined in file ld-linux-x86-64.so.2 with link time
    reference
```

2. 解決方式：若還沒退出終端機，以下面簡單方式可解決。

```
[root@dywftp lib64]# ls
[root@dywftp lib64]# LD_PRELOAD=/lib64/libc-2.12.so ln -sf \
/lib64/libc-2.12.so /lib64/libc.so.6

[root@dywftp lib64]# ll libc.so.6 libc-*
-rwxr-xr-x. 1 root root 1926760 Jan 28  2015 libc-2.12.so
-rwxr-xr-x. 1 root root 2111208 May  2 10:32 libc-2.17.so
lrwxrwxrwx. 1 root root      19 May  2 10:37 libc.so.6 -> /lib64/libc
    -2.12.so
```

3. 問題二：gnome 上方工具列顯示問題，修改以下檔案，或刪除後重新設定。

```
[dywang@dywmac ~]$ vim .gconf/apps/panel/general/%gconf.xml
```

25.8 Gnome 顯示

1. 進入圖形界面出現錯誤訊息：

```
The panel encountered a problem while loading
"OAFILD:GNOME_GnoteApplet"
```

2. 問題解決：開機自動判斷顯示器，預設不會有 xorg.conf，無法正常進入圖形界面，可以在 /etc/X11/xorg.conf.d/ 目錄下新增如下 xorg.conf 檔指定使用 vesa driver 看看。

```
[root@deyu ~]# vim /etc/X11/xorg.conf.d/xorg.conf
[root@deyu ~]# cat /etc/X11/xorg.conf.d/xorg.conf
Section "Device"
    Identifier  "Card0"
    Driver      "vesa"
    BusID       "PCI:0:2:0"
EndSection
```

25.9 影音播放

1. CentOS 6 加裝 epel-release 及 nux-dextop 套件庫，或使用 DYW Linux，執行 yum 安裝以下套件：

```
[root@dywmac ~]# yum install libdvdcss gstreamer-plugins-ugly faac faad2
    \
gstreamer-plugins-bad-nonfree vlc smplayer ffmpeg x265 gstreamer-ffmpeg
```