PV(Paravirtualized) ? FV(Fully Virtualized) ??????????????.

- **PV(Paravirtualized) ???**
  ?????? virt-manager / virt-install ??? /etc/xen ?????? Virtual Macine ???.???????????? virtual
  Machine ????????????.??????????? virtual Machine ???? RHEL4,??? /etc/xen ????????? rhel4.???????
  ?????????? virt-manager ??????.??????????????????.????????????????????.?????????? Virtual
  Machine : RHEL4 ,??????? /etc/xen/RHEL4

  ```
  [root@benjr ~]# vi /etc/xen/rhel4
  name = "rhel4"
  uuid = "cf67710d-b756-086b-8cde-be61d2faca1b"
  maxmem = 512
  memory = 512
  vcpus = 1
  bootloader = "/usr/bin/pygrub"
  on_poweroff = "destroy"
  on_reboot = "restart"
  on_crash = "restart"
  vfb = [ "type=vnc,vncunused=1,keymap=en-us" ]
  disk = [ "phy:/dev/sda5,xvda,w", "phy:/dev/sda6,xvdb,w" ]
  vif = [ "mac=00:16:3e:27:95:c0,bridge=xenbr0" ]
  ```

  - ? **name**
    ??? virtual Machine ???,???????? virtual Machine ????????.?????????.

  - ? **uuid**
    ???????(Universally Unique Identifier,UUID),?????????? uuid ????? virtual Machine.

  - ? **maxmem**
    ????????????? virtual Machine ?????????,??????????????????,????????????????? virtual
    Machine ?????.

  - ? **memory**
    ?? virtual Machine ???????????.

  - ? **vcpus**
    ? virtual Machine ?????? CPU ??.

  - ? **bootloader**
    ??? VMware ??????,?? Xen ???? virtual machine ,VMware ???????? BIOS ????? bootloader ,
    Xen ????? Paravirtualized ???, ?? virtual Machine ?????? GRUB ?? Bootloader , ?? Xen -
    Paravirtualized ??? PyGrub ???? Virtual Machine ? Boot loader(??? GRUB),

    PyGrub ?????? DomU ?? bootloader ????????? kernel ????????? kernel ??????????. ?????????
    ??? PyGrub(Bootloader) ???? Kernel ?????.

    ??? PyGrub ????????????. disk = ["phy:/dev/sda5,xvda,w", "phy:/dev/sda6,xvdb,w"] ??
    /boot ? partition ????????.????????? bootloader ????????????.

Error: Boot loader didn't return any data

pygrub ?????? PXEBoot ???.

? **on_poweroff/reboot/crash**
???? poweroff/reboot/crash VM ????????,??? poweroff ?? destory ????? poweroff ???? VM ? ??????????????,? reboot/crash ??? VM ????.

? **vfb**
Xen ??? virtual Machine ???? VNC ?????,????? vfb(virtual framebuffer device) ????????????? Keyboard/Mouse.

? **disk**
??? virtual Machine ??????????????,?????? partition ???? image ???.???????????? image . ???????:
"phy:/dev/sda5,xvda,w"

phy:/dev/sda5 - Dom0 ????????,???? image ???.
xvda - DomU ??????????,??? cdrom ??????(hda:cdrom).
w - writable(??????????)

??? (CD / DVD) ????????:
"phy:/dev/hda,hda:cdrom,r".

r - readable(??CDROM/DVD ??)

? **vif**
virtual Machine ???????.vif = ["mac=00:16:3e:27:95:c0 ,bridge=xenbr0"] ?????????????????? ??????.? RHEL5 Xen ?????????? bridge,????? QEMU ?????? virbr0,?????? Xen ????? xenbr0,?? ? Virtual machine ?????????????.

1.Virtual network - virbr0
vif =[bridge=virbr0]
??
2.Shared physical device - xenbr0
vif =[bridge=xenbr0]

- **FV(Fully Virtualized) ???**

FV(Fully Virtualized) ?????? virtual machine ???????? PV(Paravirtualized) ?,????????????.

```
[root@benjr ~]# vi /etc/xen/FV_RHEL4
name = "FV_RHEL4"
uuid = "55fb6839-faad-3578-cc2d-93f753fe8a97"
maxmem = 512
memory = 512
vcpus = 1
builder = "hvm"
kernel = "/usr/lib/xen/boot/hvmloader"
boot = "c"
```

```
pae = 1
acpi = 1
apic = 1
localtime = 0
on_poweroff = "destroy"
on_reboot = "restart"
on_crash = "restart"
device_model = "/usr/lib64/xen/bin/qemu-dm"
sdl = 0
vnc = 1
vncunused = 1
keymap = "en-us"
disk = [ "phy:/dev/sda3,hda,w", ",hdc:cdrom,r" ]
vif = [ "mac=00:16:3e:6e:61:7f,bridge=xenbr0" ]
serial = "pty"
```

? **builder**
?? virtual machine ???????????.??? HVM (hardware virtual machine) ????? XEN full virtualization(Hardware-assisted virtualization) ????????,??? CPU ???? Intel ?? VT(Virtualization Technology) ?? AMD ? V Pacifica.

? **kernel**
???? XEN full virtualization(Hardware-assisted virtualization) ???????? hvmloader(/usr/lib/xen/boot/hvmloader) ? virtual machine ???.

? **boot**
???????,????????? windows ,virtual machine ? Linux ???? (Default='c';Value='a|b|c|d')

? **pae**
Physical Address Extension (PAE) ? 32bit ? virtual machine ???? 4GB ?????? (default=1; Value='PAE')

? **acpi**
Advanced Configuration and Power Interface (ACPI) ????????? (default=1; Value='ACPI')

? **apic**
Advanced Programmable Interrupt Controller (APIC) ??? IRQ ??? (default=1; Value='APIC')

? **localtime**
??? RTC(real-time clock) ????????? (Default=0; Value='no|yes')

? **device_model**
?????? QEMU ?????,QEMU ?????????????? CPU ???????. /usr/lib64/xen/bin/qemu-dm ?????

? **sdl**
Simple DirectMedia Layer(SDL) ?????????????,??????,???? ?? , ??? , ??????. (Default=None)

? **vnc**
Virtual Network Computing(vnc) ????????????? (Default=None) ?????? 127.0.0.1 port N+5900 ??? N ??? virtual machine ? domain id ???.

- ? **vncunused**
  ????? vnc ????????? vncunused=1 ?,??????????? 5900 ?????? port ?? VNC ??. (Default=1)

- ? **keymap**
  ?????????????,???????? US keymap.

- ? **serial**
  ?????? serial console ?????? pty(Pseduo Tty) ?? vc(Virtual console)

?????????? Xen ?????. http://www.xen.org/files/Support/XenConfigurationDetails.pdf

- **????(Auto booting) Virtual Machine**

???? RHEL5 ?? Dom0 ???,virtual machine ???????,????????????? virtual machine ?????? virtual machine ????
??? /etc/xen/auto ????.????:
?????? Guest OS ? rhel4 / rhel5

?????????? rhel4 / rhel5 ??????.

```
[root@benjr ~]# cd /etc/xen
[root@benjr ~]# chkconfig xend on
[root@benjr xen]# ln rhel4 auto/
[root@benjr xen]# ln rhel5 auto/
```

- **virtual machine image files (? Selinux ???,????????????,??? virtual machine images ????????? ????????)**

/var/lib/xen/images

- **Log file(RHEL5 ?????????????? Xen + Qemu ? log ?????)**

/var/log/xen/xend.log
/var/log/xen/qemu-dm.log

- **proc ???????**

/proc/xen/capabilities
/proc/xen/balloon   ?????
/proc/xen/xenbus/