Introduction to SlackVirt

William PC

May 28, 2021

Contents

1 Introduction

SlackVirt is a cloud pocket system intended to be simple, versatile and efficient. It's mented to provided a virtualization solution for Slackware hosts with minimal system modifications. The pocket idea came from the ability of create initram disks for mantaining different setups. That can fits into portable storage devices.

Therefore, a unique host machine can be booted with different initram disks with custom configuration that can bring virtual machines from external storage devices.

SlackVirt isn't a real emulator or a virtualization solution, but a virtualization platform for maintain a Slackware based virtual machine host. Which includes compatible tools to its aimed Linux distribution that can handle typical administrative operations on a set of virtualized machines that can be connected through an ethernet virtualized network.

SlackVirt do not maintain a strict package dependency list, but according to some premises it was decided which Slackware package series shall be installed as following:

- Required: a, ap, l, tcl

- Recommended: f, n, x, xap

- Optional: e, d, k, kde, kdei, xfce, y

NOTE: package series ”d, k” is required if you want to build SlackVirt packages, such as: qemu and spice-gtk or compiling other softwares. The ”x, xap” series are recomended if you want to use and access the desktop instance localy.

Nonetheless SlackVirt installer tool will ask to install the required packages from one of the slackpkg templates: small or full. Therefore slackpkg is required for the installation procedure. The templates are made as following:

- small, will include the basic requirements for running SlackVirt instances, without X server.

- full, this installs all the packages from small plus the required packages for running X server.

SlackVirt includes two qemu packages, such as: qemu-server and qemu-desktop. They are compiled different according to the premises of each machine type, been a server and a desktop machine, disabling functions of the generated binary files allowing them to be independent of some host libraries. They mainly diffences are the following:

- qemu-server, no spice, no audio backend and without usb redirection.

- qemu-desktop, support for spice, compiled audio backends and support for usb redirection.

Let's suppose that a video card has to be changed in a desktop from our "computer park", there is no need to shutdown the server in the datacenter. Therefore making easy for maintaining the slackvirt host machine and running virtual instances.

There are a few sniplets that are compatible to libvirt at least those that are related to SlackVirt structure and operating mode.

SlackVirt also includes an usrlocal "disk" for the server and the desktop instances. That can be used to creates img files that can be attached to the VMs. The set of scripts helps to easily deploy/configure the instances according:

- server: dhcpd daemons, manipulate LXCs

- desktop: vncserver daemon for different users.

1.1 Software machines (SMs)

SlackVirt comes with two types of virtual machines precondigured

- server, no video output.
- desktop, with video output.

The default server SM is configured as following:

- CPU = Broadwell-IBRS

- RAM = 1G

- VIDEO = none

- DISK = 7 disks (3 IDE and 4 SATA)

- NETWORK = three interfaces

- USB = USB 2.0 (internal only)

- AUDIO = none

The default desktop SM, is configured as following:

- CPU = Broadwell-IBRS

- RAM = 1G

- VIDEO = vmware

- DISK = 4 disks (3 IDE and 2 SATA)

- NETWORK = three interfaces

- USB = USB 3.0 (with host bind)

- AUDIO = Intel HD Audio

1.2 Requirements

2 Installation

SlackVirt version 14.2 requires a Slackware host system running the same architecture and version, for example:

- SlackVirt 14.2 shall be installed at a Slackware 14.2 (32-bit)

- SlackVirt64 14.2 shall be installed at a Slackware64 14.2 (64-bit)

Slackvirt package series are divided as following:

- a The basic SlackVirt system packages, contains SlackVirt core.

- ap Aditional application that do not require X Window System.

- d Development packages.

- l System libraries.

- n Network tools.

- qemu The QEMU program and related tools.

- x X11 basic enviroment tools.

- xap X11 applications.

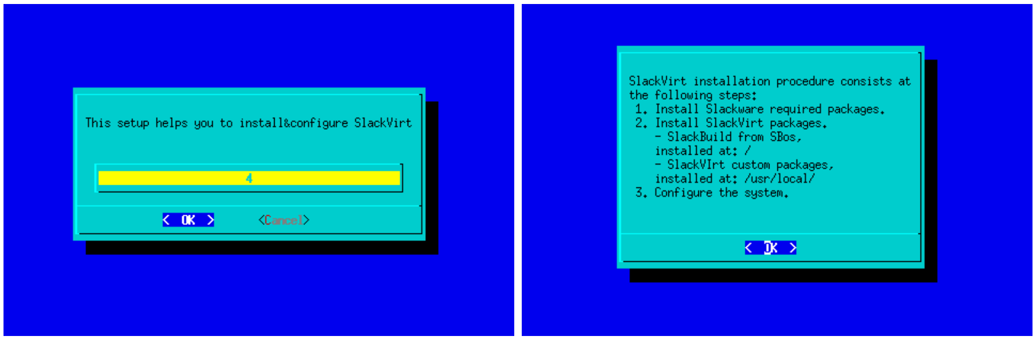
```
# installing slackvirt
root@darkstar:/mnt/cdrom# ./installer/slackvirt-install
```

```
# using custom kernel
KVERSION=4.14.166 ./installer/slackvirt-install
```

After a small introduction and inform what will be done as show in Figure 1 the setup will guides the installation procedure as show in Figure 2.

Configure the startup script editing the /etc/rc.d/rc.local, as following:

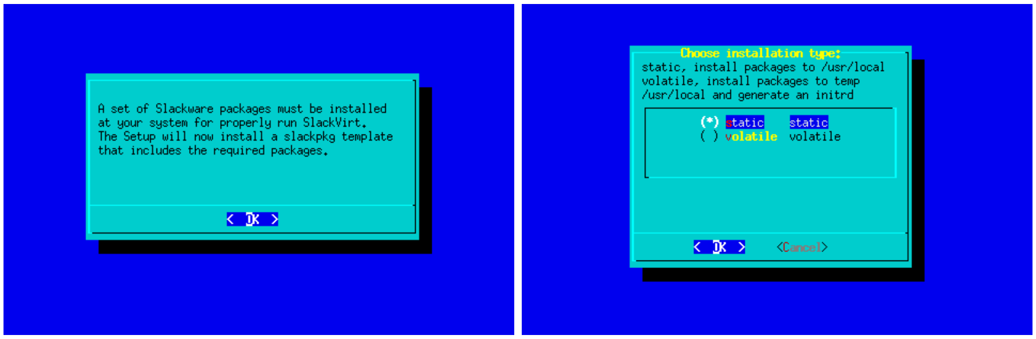
```
# if  [ -x /usr/local/etc/rc.d/rc.S.slackvirt ]; then
#  /usr/local/etc/rc.d/rc.S.slackvirt
# fi
```



```
This setup helps you to install&configure SlackVirt
```

```
SlackVirt installation procedure consists at
the following steps:
 1. Install Slackware required packages.
 2. Install SlackVirt packages.
    - SlackBuild from SBos,
    installed at: /
    - SlackVIrt custom packages,
    installed at: /usr/local/
 3. Configure the system.
```

Figure 1: The setup tool



```
A set of Slackware packages must be installed
at your system for properly run SlackVirt.
The Setup will now install a slackpkg template
that includes the required packages.
```

```
Choose installation type:
static, install packages to /usr/local
volatile, install packages to temp
/usr/local and generate an initrd

(*) static     static
( ) volatile  volatile
```

Figure 2: The setup tool

Consequently the shutdown script editing the /etc/rc.d/rc.local_shutdown, as following:

3 Setup

By default SlackVirt has configured two default computer instances, a server and a desktop. Let's presume here that SlackVirt intents to follow the Slackware way/development/educational philosofy.

Defining that SlackVirt, it's just a virtualization host and will be referenced here as a machine too, the other two computers cited will be the ”server” and the ”desktop”, having in mind that they are virtual machines.

Therefore the machines, are delivered according to some premises, which are:

- The server, a displayless computer machine, of a data center.

- The desktop, a visual enhanced computer machine, at home.

By default both machines, have serial connections that can be used at the bootup procedure or/and as normal consoles. However the desktop presents two graphic cards for enhanced visual experiences, that are not intended to be done at server machines which used to lacks graphic hardware support. Slackvirt takes that idea for defining its default machines.

The full characteristcs of the machines can be found at the flat files that holds it's configurations, which are saved at: /usr/local/etc/slackvirt. The configuration files just defines the virtual machine hardware and do not include a bootable disk with a Slackware installation on it. Thereby, it's required that users creates the disks and perform the system installation.

Let's see some notes about a pratical system configuration.

Creating a qcow2 image:

```
# qemu-img create -f qcow2 /mnt/hd/slackware/14.2/slackware
    -14.2.img 15G
```

Then partitioning the disk with one partition:

```
# fdisk /mnt/hd/slackware/14.2/slackware-14.2.img (n, enter,
    enter, enter, enter, w)
```

Creating the file system:

```
# losetup -P loop0 /mnt/hd/slackware/14.2/slackware-14.2.img
# mkfs.ext4 /dev/loop0p1
```

Installing Slackware system:

```
# PKG_SERIES="A#AP#D#L#N#" \
#    DISK0=/var/lib/slackvirt/slackware/14.2/slackware-14.2.img \
#    slackware-qemu-vmserver.sh install \
#    /usr/local/etc/slackvirt/machines/slackware/slackware-14.2/slackware.qemu
```

4 Network

SlackVirt default SMs comes with three network IF cards configured attached to the host bridges: qemubr0, qemubr1 and qemubr2.

4.1 Configuration

The host system can be manually configured over:

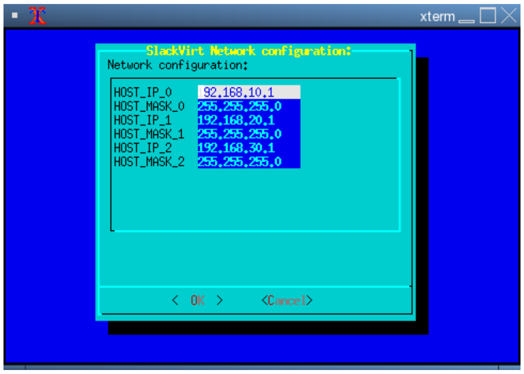
/usr/local/etc/rc.d/rc.inet1.conf

To configure network address of slackvirt host, server and desktop SMs, use the tool:

netconfig.slackvirt

can be used for generating the configuration files.

By default the tool will just prompt for the host setup. However, the enviroment variable MACHINES is used to define extra configuration options for the SMs, either "server", "desktop" or "server desktop". This will generate the according inet1_{server—desktop}.conf for the SMs, that can be uploaded manualy or using the tool update-slackvirt-machines.sh located at /usr/local/libexec, which requires a logged-in console.



```
SlackVirt Network configuration:
Network configuration:

HOST_IP_0     192.168.10.1
HOST_MASK_0   255.255.255.0
HOST_IP_1     192.168.20.1
HOST_MASK_1   255.255.255.0
HOST_IP_2     192.168.30.1
HOST_MASK_2   255.255.255.0
```

Figure 3: Network Configuration

4.2 Wireless

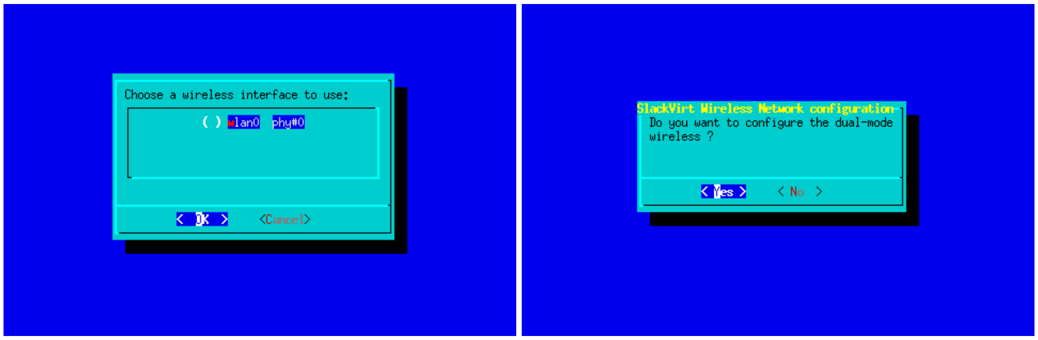
If host wireless adapter supports virtual radio interfaces it can be used to create two wireless IFs, one as an access point (AP) and other as station.

For configuring wireless network, the setup tool can be used:

/usr/local/var/log/setup/setup.70.local-wireless

It will prompt to choose one of the detected wireless network IF for been configured.

NOTE: for using wireless in AP mode it's required to install hostapd from extra packages.



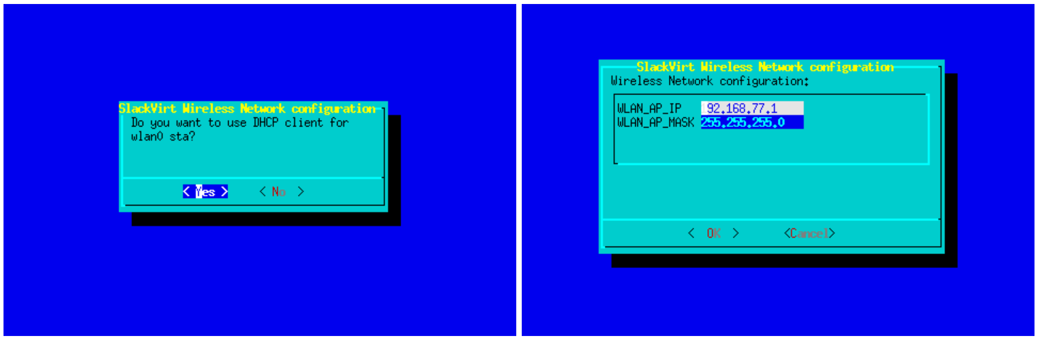
Choose a wireless interface to use:

( ) wlan0 phy#0

SlackVirt Wireless Network configuration

Do you want to configure the dual-mode wireless ?

Figure 4: Wireless setup tool



SlackVirt Wireless Network configuration

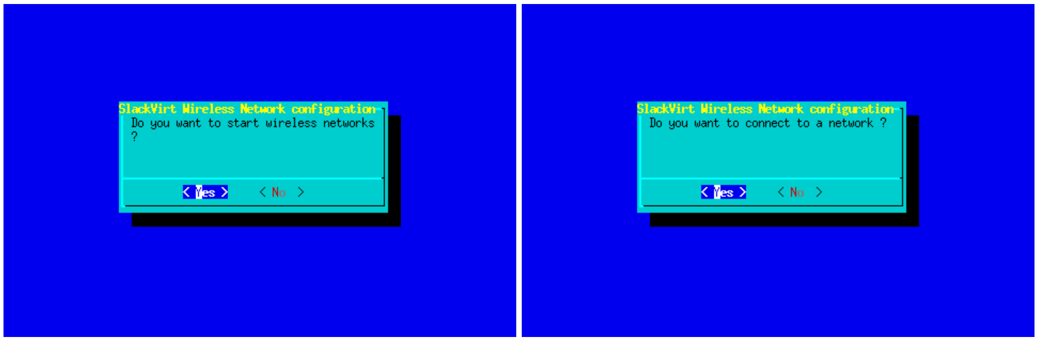
Do you want to use DHCP client for wlan0 sta?

SlackVirt Wireless Network configuration

Wireless Network configuration:

```
WLAN_AP_IP   92.168.77.1
WLAN_AP_MASK 255.255.255.0
```

Figure 5: Wireless setup tool


SlackVirt Wireless Network configuration

Do you want to start wireless networks ?

SlackVirt Wireless Network configuration

Do you want to connect to a network ?

Figure 6: Wireless setup tool

5 Management

5.1 Commands

slackware-qemu-vmserver.sh command [vmfile.qemu]

Commands:

- list: list running VMs

- install "vmfile.qemu" automated slackware installation

- start "vmfile.qemu" starts a SM

- stop "vmfile.qemu" stops a SM - Send a ACPI powerdown signal, then waits specific timeout variable then send a SIGKILL to QEMU process.

- powerdown "vmfile.qemu" send ACPI powerdown signal

- wakeup "vmfile.qemu" send ACPI wakeup signal

- resume "vmfile.qemu" QEMU resume command

- pause "vmfile.qemu" QEMU pause command

- save:

- load:

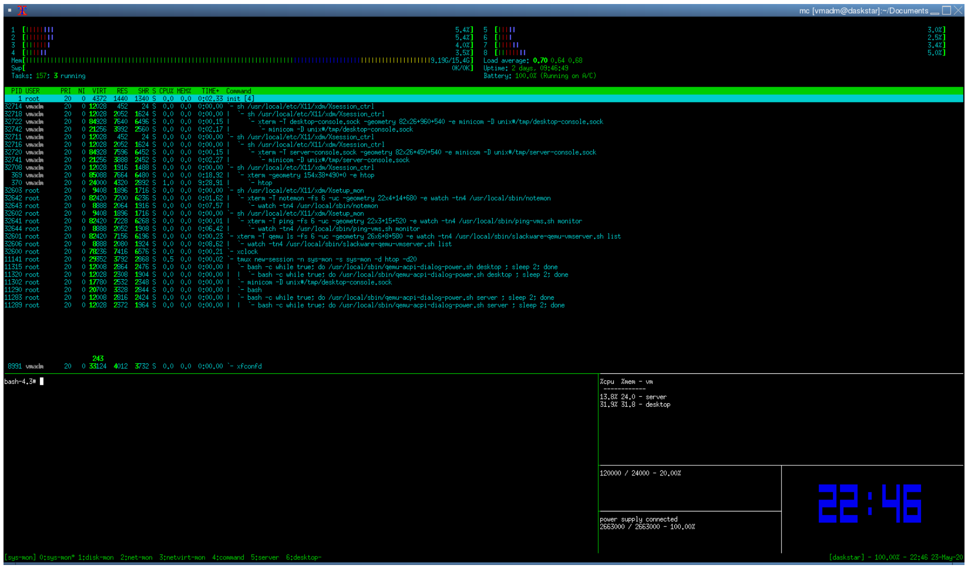
- configure ”vmfile.qemu” configure VM parameters

- status ”vmfile.qemu” check VM status

5.2 tmux session

slackvirt-mon.sh

first window system process second window storage third window network server desktop



```
  1  [|||||||||                                                  5.4%]   5  [||||||                                            3.0%]
  2  [|||||||||                                                  5.4%]   6  [||||                                              2.5%]
  3  [||||||||                                                   4.0%]   7  [|||||||                                           3.4%]
  4  [|||||||                                                    3.5%]   8  [||||||||||                                        5.0%]
  Mem[|||||||||||||||||||||||||||||||||||||||||||||||||||9.19G/15.4G]   Load average: 0.70 0.64 0.68
  Swp[                                                          0K/0K]   Uptime: 2 days, 09:46:49
  Tasks: 157; 3 running                                                  Battery: 100.0% (Running on A/C)

  PID USER      PRI  NI  VIRT   RES   SHR S CPU% MEM%   TIME+  Command
    1 root       20   0  4372  1440  1340 S  0.0  0.0  0:02.33 init [4]
32714 vmadm      20   0 12028   452    24 S  0.0  0.0  0:00.00 `- sh /usr/local/etc/X11/xdm/Xsession_ctrl
32718 vmadm      20   0 12028  2052  1624 S  0.0  0.0  0:00.00 |  `- sh /usr/local/etc/X11/xdm/Xsession_ctrl
32722 vmadm      20   0 84928  7640  6496 S  0.0  0.0  0:00.15 |     `- xterm -T desktop-console.sock -geometry 82x26+960+540 -e minicom -D unix#/tmp/desktop-console.sock
32742 vmadm      20   0 21256  3992  2560 S  0.0  0.0  0:02.17 |        `- minicom -D unix#/tmp/desktop-console.sock
32711 vmadm      20   0 12028   452    24 S  0.0  0.0  0:00.00 `- sh /usr/local/etc/X11/xdm/Xsession_ctrl
32716 vmadm      20   0 12028  2052  1624 S  0.0  0.0  0:00.00 |  `- sh /usr/local/etc/X11/xdm/Xsession_ctrl
32720 vmadm      20   0 84928  7596  6452 S  0.0  0.0  0:00.15 |     `- xterm -T server-console.sock -geometry 82x26+450+540 -e minicom -D unix#/tmp/server-console.sock
32741 vmadm      20   0 21256  3888  2452 S  0.0  0.0  0:02.27 |        `- minicom -D unix#/tmp/server-console.sock
32708 vmadm      20   0 12028  1916  1488 S  0.0  0.0  0:00.00 `- sh /usr/local/etc/X11/xdm/Xsession_ctrl
  369 vmadm      20   0 85088  7664  6480 S  0.0  0.0  0:18.92 |  `- xterm -geometry 154x38+490+0 -e htop
  370 vmadm      20   0 24000  4320  2892 S  1.0  0.0  9:28.91 |     `- htop
32603 root       20   0  9408  1896  1716 S  0.0  0.0  0:00.00 `- sh /usr/local/etc/X11/xdm/Xsetup_mon
32642 root       20   0 82420  7200  6236 S  0.0  0.0  0:01.62 |  `- xterm -T notemon -fs 6 -uc -geometry 22x4+14+680 -e watch -tn4 /usr/local/sbin/notemon
32643 root       20   0  8888  2064  1916 S  0.0  0.0  0:07.57 |     `- watch -tn4 /usr/local/sbin/notemon
32602 root       20   0  9408  1896  1716 S  0.0  0.0  0:00.00 `- sh /usr/local/etc/X11/xdm/Xsetup_mon
32641 root       20   0 82420  7228  6268 S  0.0  0.0  0:00.01 |  `- xterm -T ping -fs 6 -uc -geometry 22x3+15+520 -e watch -tn4 /usr/local/sbin/ping-vms.sh monitor
32644 root       20   0  8888  2052  1908 S  0.0  0.0  0:06.42 |     `- watch -tn4 /usr/local/sbin/ping-vms.sh monitor
32601 root       20   0 82420  7156  6196 S  0.0  0.0  0:00.23 `- xterm -T qemu ls -fs 6 -uc -geometry 26x6+8+580 -e watch -tn4 /usr/local/sbin/slackware-qemu-vmserver.sh list
32606 root       20   0  8888  2080  1924 S  0.0  0.0  0:08.62 |  `- watch -tn4 /usr/local/sbin/slackware-qemu-vmserver.sh list
32600 root       20   0 78236  7416  6576 S  0.0  0.0  0:00.21 `- xclock
11141 root       20   0 29352  3792  2868 S  0.5  0.0  0:00.02 `- tmux new-session -n sys-mon -s sys-mon -d htop -d20
11315 root       20   0 12008  2864  2476 S  0.0  0.0  0:00.00 |  `- bash -c while true; do /usr/local/sbin/qemu-acpi-dialog-power.sh desktop ; sleep 2; done
11320 root       20   0 12028  2308  1904 S  0.0  0.0  0:00.00 |  |  `- bash -c while true; do /usr/local/sbin/qemu-acpi-dialog-power.sh desktop ; sleep 2; done
11302 root       20   0 17780  2532  2348 S  0.0  0.0  0:00.00 |  `- minicom -D unix#/tmp/desktop-console.sock
11290 root       20   0 20700  3328  2844 S  0.0  0.0  0:00.00 |  `- bash
11283 root       20   0 12008  2816  2424 S  0.0  0.0  0:00.00 |  `- bash -c while true; do /usr/local/sbin/qemu-acpi-dialog-power.sh server ; sleep 2; done
11289 root       20   0 12028  2372  1964 S  0.0  0.0  0:00.00 |  |  `- bash -c while true; do /usr/local/sbin/qemu-acpi-dialog-power.sh server ; sleep 2; done



                        243
 8991 vmadm      20   0 33124  4012  3732 S  0.0  0.0  0:00.00 `- xfconfd
```

```
bash-4.3# █
```

```
%cpu  %mem - vm
 ------------
13.8% 24.0 - server
31.9% 31.8 - desktop
```

```
120000 / 24000 - 20.00%
```

```
power supply connected
2663000 / 2663000 - 100.00%
```

```
[sys-mon] 0:sys-mon* 1:disk-mon  2:net-mon  3:netvirt-mon  4:command  5:server  6:desktop-          [daskstar] - 100.00% - 22:46 23-May-20
```

Figure 7: tmux session - window 0

6 X11

SlackVirt comes with support for x11, including customized XDM sessions and tools for managing and controlling the host system and the SMs.

6.1 XDM

There is two XDM sessions, configured as following:

- The first one is intended to be used for monitoring the host resources and do not start any window manager. By default will starts two windows connected to the SM (server/desktop) serial lines.

- The second one is intended to be used for accessing the SMs, including support for backbox and fluxbox window managers. This one do not allow root login.

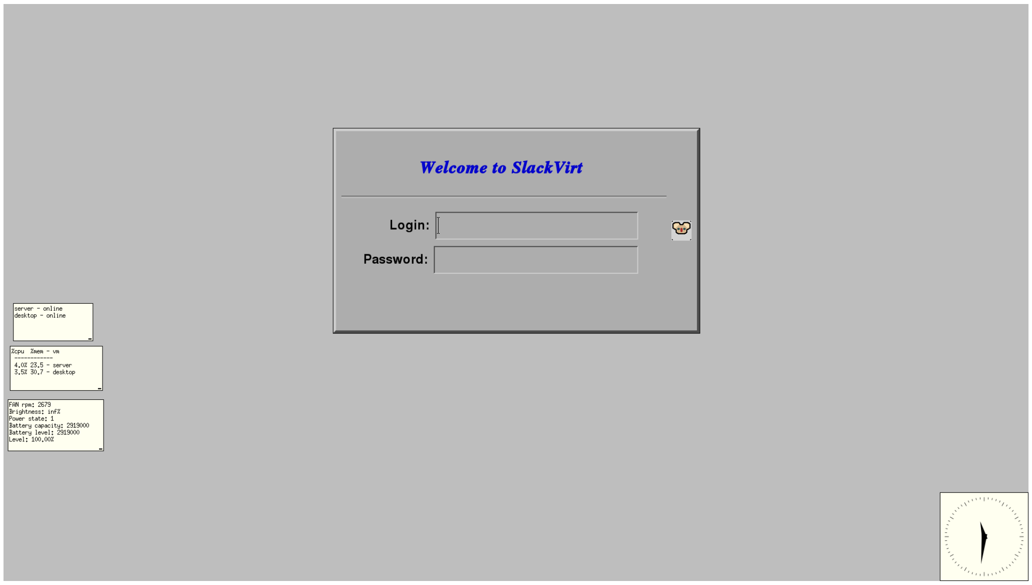
The second xdm session has built-in customizations, some of them are the following:

- blackbox (ctrl+return), slackvirt menu entry, bbkeys started at background.

- fluxbox (return), slackvirt menu entry, autostart xnotemon and two monitoring tools (xterms scripted, for qemu-ls and ping SMs).

- fluxbox (shift+return), slackvirt menu entry, autostart xnotemon and two monitoring tools (xterms scripted, for qemu-ls and ping SMs) and disabled a few shortcuts for a enhanced user experience using a windowed VNC connection.

To see the detailed customizations of each session consults the configuration files at: /usr/local/etc/X11/xdm and /usr/local/share/blackbox,fluxbox



```
server - online
desktop - online
```

```
%cpu  %mem - vm
 ------------
 4.0% 23.5 - server
 3.5% 30.7 - desktop
```

```
FAN rpm: 2679
Brightness: inf%
Power state: 1
Battery capacity: 2919000
Battery level: 2919000
Level: 100.00%
```

Figure 8: X:1 session

6.2 XAPs

There are some custom applications that can be used at X11 for monitoring the slackvirt qemu machine status, network and the host system.

- xnotemon, monitor for brightness and power state.

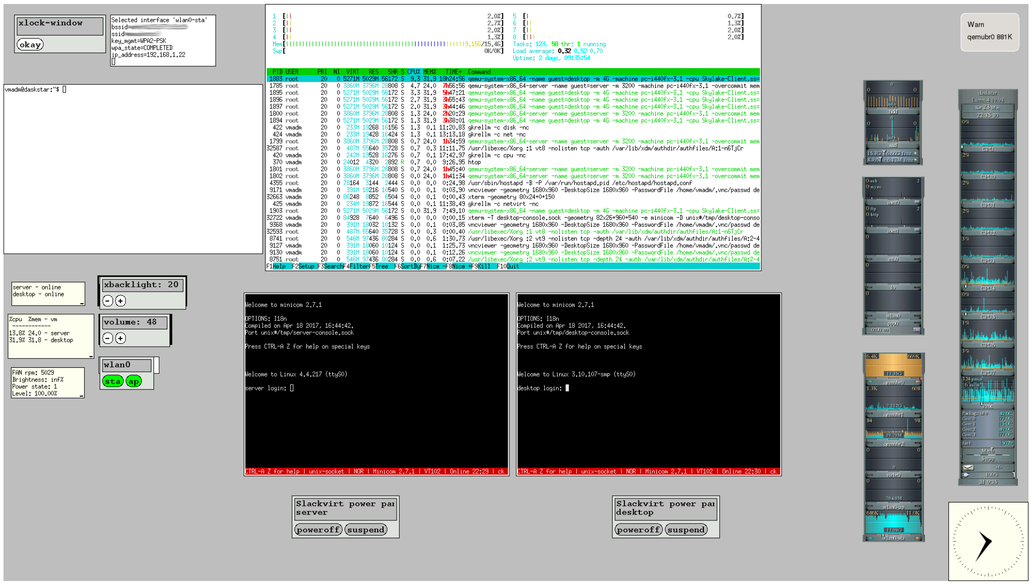
- xbacklight-ctrl.sh, host backlight control.

- xaudio-ctrl.sh, host volume control.

- xslackvirt-powerpanel.sh, a window power panel for SMs.

- xwireless-ctrl.sh, enable disable host wireless IFs.

- gkrellms-split.sh, three configurable gkrellms instances



```
Selected interface 'wlan0-sta'
bssid=[redacted]
ssid=[redacted]
key_mgmt=WPA2-PSK
wpa_state=COMPLETED
ip_address=192.168.1.22
```

```
vmadm@daskstar:~$
```

```
  1  [||                                   2.0%]   5  [|                                    0.7%]
  2  [||                                   2.7%]   6  [||                                   1.3%]
  3  [||                                   2.0%]   7  [||                                   2.0%]
  4  [||                                   1.3%]   8  [|||                                  2.0%]
  Mem[||||||||||||||||||||||||||||||||||||||||||||9.15G/15.4G]   Tasks: 123, 58 thr; 1 running
  Swp[                                       0K/0K]   Load average: 0.32 0.52 0.70
                                                      Uptime: 2 days, 09:35:54

  PID USER      PRI  NI  VIRT   RES   SHR S CPU% MEM%   TIME+  Command
 1883 root       20   0 5271M 5029M 56172 S  9.3 31.9 18h24:56 qemu-system-x86_64 -name guest=desktop -m 4G -machine pc-i440fx-3.1 -cpu Skylake-Client,ss=
 1785 root       20   0 3860M 3796M 28808 S  4.7 24.0  7h56:56 qemu-system-x86_64-server -name guest=server -m 3200 -machine pc-i440fx-3.1 -overcommit mem
 1895 root       20   0 5271M 5029M 56172 S  3.3 31.9  5h47:21 qemu-system-x86_64 -name guest=desktop -m 4G -machine pc-i440fx-3.1 -cpu Skylake-Client,ss=
 1896 root       20   0 5271M 5029M 56172 S  2.7 31.9  3h55:43 qemu-system-x86_64 -name guest=desktop -m 4G -machine pc-i440fx-3.1 -cpu Skylake-Client,ss=
 1897 root       20   0 5271M 5029M 56172 S  2.0 31.9  3h44:46 qemu-system-x86_64 -name guest=desktop -m 4G -machine pc-i440fx-3.1 -cpu Skylake-Client,ss=
 1800 root       20   0 3860M 3796M 28808 S  1.3 24.0  2h20:29 qemu-system-x86_64-server -name guest=server -m 3200 -machine pc-i440fx-3.1 -overcommit mem
 1894 root       20   0 5271M 5029M 56172 S  1.3 31.9  3h38:01 qemu-system-x86_64 -name guest=desktop -m 4G -machine pc-i440fx-3.1 -cpu Skylake-Client,ss=
  422 vmadm      20   0  233M 19268 16156 S  1.3  0.1 11:20.83 gkrellm -c disk -nc
  424 vmadm      20   0  233M 19428 16424 S  1.3  0.1 13:13.18 gkrellm -c net -nc
 1799 root       20   0 3860M 3796M 28808 S  0.7 24.0  1h34:59 qemu-system-x86_64-server -name guest=server -m 3200 -machine pc-i440fx-3.1 -overcommit mem
32587 root       20   0  487M 55640 35728 S  0.7  0.3 11:11.75 /usr/libexec/Xorg :1 vt8 -nolisten tcp -auth /var/lib/xdm/authdir/authfiles/A:1-n6TjCr
  420 vmadm      20   0  242M 19528 16276 S  0.7  0.1 17:42.97 gkrellm -c cpu -nc
  370 vmadm      20   0 24012  4320  2892 R  0.7  0.0  9:26.95 htop
 1801 root       20   0 3860M 3796M 28808 S  0.7 24.0  1h45:40 qemu-system-x86_64-server -name guest=server -m 3200 -machine pc-i440fx-3.1 -overcommit mem
 1802 root       20   0 3860M 3796M 28808 S  0.0 24.0  1h41:34 qemu-system-x86_64-server -name guest=server -m 3200 -machine pc-i440fx-3.1 -overcommit mem
 4355 root       20   0 78164  3144  2444 S  0.0  0.0  0:24.98 /usr/sbin/hostapd -B -P /var/run/hostapd.pid /etc/hostapd/hostapd.conf
 9171 vmadm      20   0  391M 18216 10540 S  0.0  0.1  0:03.90 vncviewer -geometry 1680x960 -DesktopSize 1680x960 -PasswordFile /home/vmadm/.vnc/passwd de
32663 vmadm      20   0 86248  8852  6504 S  0.0  0.1  0:00.43 xterm -geometry 80x24+0+150
  425 vmadm      20   0  234M 19872 16544 S  0.0  0.1 11:38.49 gkrellm -c netvirt -nc
 1903 root       20   0 5271M 5029M 56172 S  0.0 31.9  7:49.10 qemu-system-x86_64 -name guest=desktop -m 4G -machine pc-i440fx-3.1 -cpu Skylake-Client,ss=
32722 vmadm      20   0 84928  7640  6496 S  0.0  0.0  0:00.15 xterm -T desktop-console.sock -geometry 82x26+960+540 -e minicom -D unix#/tmp/desktop-conso
 9368 vmadm      20   0  391M 18032 10132 S  0.0  0.1  0:03.85 vncviewer -geometry 1680x960 -DesktopSize 1680x960 -PasswordFile /home/vmadm/.vnc/passwd de
32593 root       20   0  487M 55640 35728 S  0.0  0.3  0:00.40 /usr/libexec/Xorg :1 vt8 -nolisten tcp -auth /var/lib/xdm/authdir/authfiles/A:1-n6TjCr
 8741 root       20   0  546M 97436 80284 S  0.0  0.6  1:30.73 /usr/libexec/Xorg :2 vt9 -nolisten tcp -depth 24 -auth /var/lib/xdm/authdir/authfiles/A:2-4
 9127 vmadm      20   0  391M 18060 10124 S  0.0  0.1  1:25.73 vncviewer -geometry 1680x960 -DesktopSize 1680x960 -PasswordFile /home/vmadm/.vnc/passwd de
 9130 vmadm      20   0  391M 18060 10124 S  0.0  0.1  0:12.26 vncviewer -geometry 1680x960 -DesktopSize 1680x960 -PasswordFile /home/vmadm/.vnc/passwd de
 8751 root       20   0  546M 97436 80284 S  0.0  0.6  0:07.22 /usr/libexec/Xorg :2 vt9 -nolisten tcp -depth 24 -auth /var/lib/xdm/authdir/authfiles/A:2-4
F1Help  F2Setup F3SearchF4FilterF5Tree  F6SortByF7Nice -F8Nice +F9Kill  F10Quit
```

```
server - online
desktop - online
```

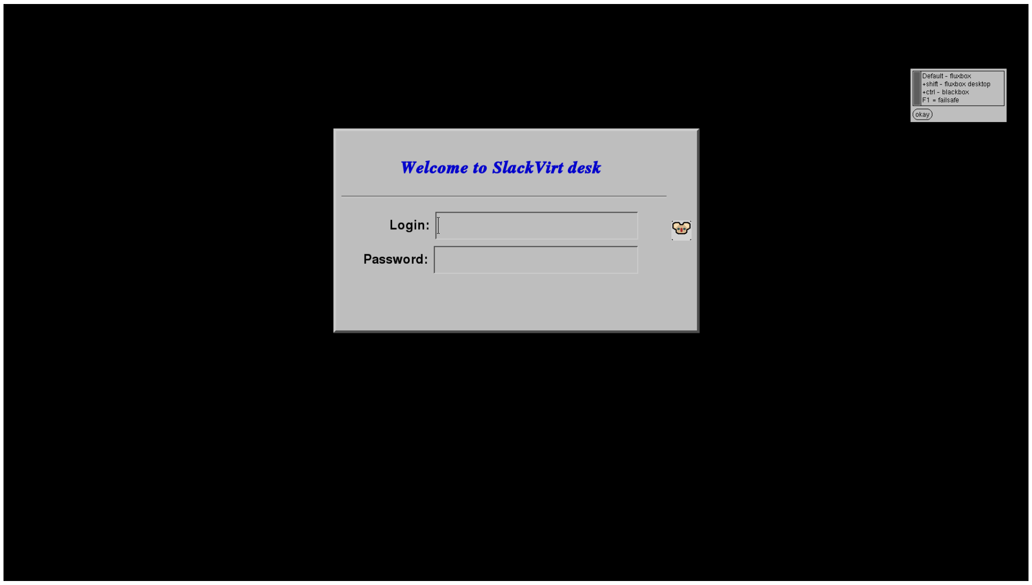
```
%cpu  %mem - vm
 -----------
13.8% 24.0 - server
31.9% 31.8 - desktop
```

```
FAN rpm: 5029
Brightness: inf%
Power state: 1
Level: 100.00%
```

```
Welcome to minicom 2.7.1

OPTIONS: I18n
Compiled on Apr 18 2017, 16:44:42.
Port unix#/tmp/server-console.sock

Press CTRL-A Z for help on special keys


Welcome to Linux 4.4.217 (ttyS0)

server login:

CTRL-A Z for help | unix-socket | NOR | Minicom 2.7.1 | VT102 | Online 22:29 | ck
```

```
Welcome to minicom 2.7.1

OPTIONS: I18n
Compiled on Apr 18 2017, 16:44:42.
Port unix#/tmp/desktop-console.sock

Press CTRL-A Z for help on special keys


Welcome to Linux 3.10.107-smp (ttyS0)

desktop login:

CTRL-A Z for help | unix-socket | NOR | Minicom 2.7.1 | VT102 | Online 22:30 | ck
```

Figure 9: XDM session 1 screenshot



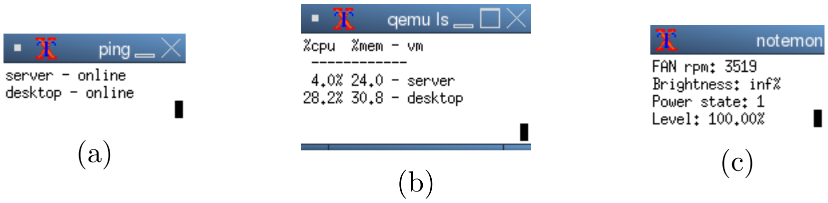
Default - fluxbox
+shift - fluxbox desktop
+ctrl - blackbox
F1 = failsafe

Welcome to SlackVirt desk

Login:

Password:

Figure 10: X:2 session



```
server - online
desktop - online
```

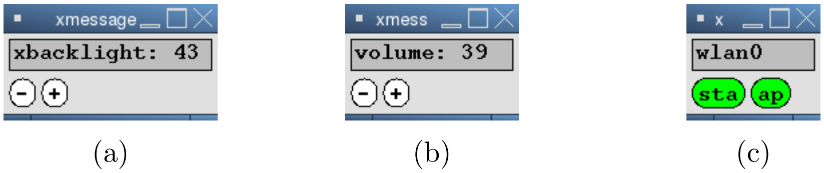
(a)

```
%cpu  %mem - vm
 ------------
 4.0% 24.0 - server
28.2% 30.8 - desktop
```

(b)

```
FAN rpm: 3519
Brightness: inf%
Power state: 1
Level: 100.00%
```

(c)



xbacklight: 43

(a)

volume: 39

(b)

wlan0

(c)

Figure 12: xmessage tools