ctys-uc-CentOS(7)
Setup CentOS

August 18, 2012

Contents

List of Figures

.

1 General

The current document shows the basic installation of CentOS, which is basically a derivative of RedHat(TM) Linux variant.

The following host environment is used here:

- CentOS-5.4 with kvm-83 / Qemu-0.9.1
- Debian-5.0.6 with VirtualBox-3.2.10
- CentOS-5.4 with VMware-Player-2
- CentOS-5.4 with VMware-Player-3
- CentOS-5.5 with VMware-Server-2.0.2
- CentOS-5.4 with VMware-Workstation-6
- CentOS-5.4 with VMware-Workstation-7
- OpenSUSE-11.3 with Xen-3.x

The following client environment is used here:

- CentOS-5.5
- UnifiedSessionsManager - ctys-01.11.011

The following common assumptions and simplifications are choosen, when multiple approaches are valid.

1. The initial start of the machines are executed before scanning these into the inventory database. Thus the call is frequently executed by the suboption 'b:$PWD', which defines the filesystem scan to be started at the given directory, in this case the current dir. This is particularly helpful in NFS based distributed environments with processing nodes containing identical directory structures.
2. The initial installation is proceeded by the vendor tools, when available. This avoids some deeper knowledge for the application of varios options.
3. The example setups are generally the provided defaults by the distributions. This should be also the first trial to become familiar with the environment.

.

2 Setup of Host-OS and Hypervisor

The installation for the following variants has to be performed by the appropriate standard setup of the HostOS, which quite straight forward:

Debian with VirtualBox

CentOS with QEMU/KVM

CentOS with VMware-Server

CentOS with VMware-Player

CentOS with Xen

3 Setup of the UnifiedSessionsManager

3.1 Install tgz-Packages

1. Apply the standard installation procedure:

   ```
   ctys-distribute -F 2 -P UserHomeCopy root@myHost
   ```

2. Open a Remote Shell by call of CLI plugin:

   ```
   ctys -t cli -a create=l:myHost root@myHost
   ```

3. Check the plugins states by calling ctys-plugins:

   ```
   ctys-plugins -T all -E
   ```

3.2 Install rpm-Packages

The following steps are required for a RPM based setup on CentOS. The installation is relocatable, but located at '/opt', and installed locally by 'ctys-distribute'.

1. Install BASE package.

   ```
   rpm -i ctys-base-01.11.011.noarch.rpm
   ```

2. Now install a a local version, here by copy. The PATH prefix is important here, particularly in case of updates. The path is resolved to it's actual path by eliminating any symbolic link, and used for consistent link of libraries.

   ```
   /opt/ctys-01.11.011/bin/ctys-distribute -F 2 -P UserHomeCopy
   ```

3. Next the menu is setup.

   ```
   ctys-xdg --menu-create
   ```

4. Now the help is available as eihter a Gnome or KDE menu. Alternatively could be called from the commandline.

3.3 Setup of the Gnome Menu

The setup of the Gnome Menu is quite simple, the contained tool **ctys-xdg** sets up a standard menu by the call:

```
ctys-xdg --menu-create
```

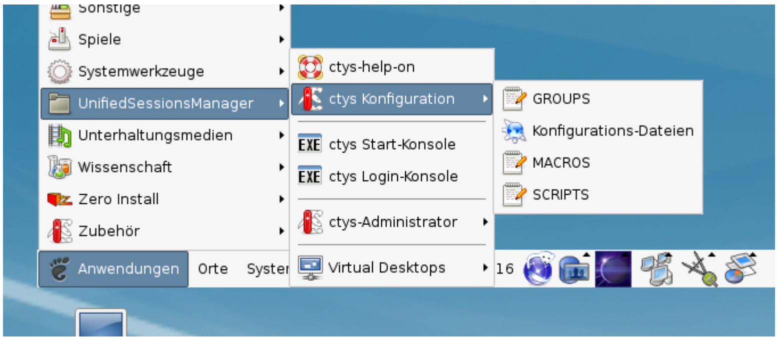


Figure 1: Default Menu

The call

```
ctys-xdg --menu-cancel
```

removes the installed files. For current version no checks for changed files is done.

The menues could be edited and extended by the call

```
ctys-xdg --menu-edit
```

which opens the related directories for modification of '*.menu', '*.desktop', and '*.directory' files.

4 Creation of the the Raw-VM

4.1 Creation of the Raw-VM with QEMU/KVM

The demo example VM is here named tst219, this is the hostname of GuestOS too.

1. Login into the machine where VirtualBox is installed.

   ```
   ssh -X app2
   ```

   When just the processing node of mounted filesystem has to be changed, the following call could be applied. This works in case of identical mount paths:

   ```
   ctys -t cli -a create=l:tst220,cd:$PWD root@lab02
   ```

2. Change to the vmpool and create a directory and change into.

   ```
   mkdir tst219
   ```

3. Call the install and configuration utility for VMs. Here some values are set by environment variables, a complete list including the actually assigned values could be displayed by the option –**levo**.

   ```
   ARCH=x86_64 \
   DIST=CentOS \
   DISTREL=5.5 \
   OS=Linux \
   OSREL=2.6 \
   ctys-createConfVM -t qemu --label=tst219
   ```

   This call creates a virtual image(hda.img), the call-wrapper(tst219.sh), and the configuration file(tst219.ctys). The files are created from templates by assigning configuration values either from pre-configured default values, or interactive variation. The whole process of createion could be batch-proceeded by using the either teh –**auto**, or the –**auto-all** option when appropriate default values are preconfigured.

   When no MAC database nor DHCP is available, the MAC and IP addresses might be provided too.

4. Once the set of files is created the virtual machine is prepared for startup. For some other systems complete installation routines are available, e.g. debian and CentOS. The current state could be checked now by the following call.

   ```
   ./tst219.sh --console=vnc  --vncaccessdisplay=47 --print --instmode --check
   ```

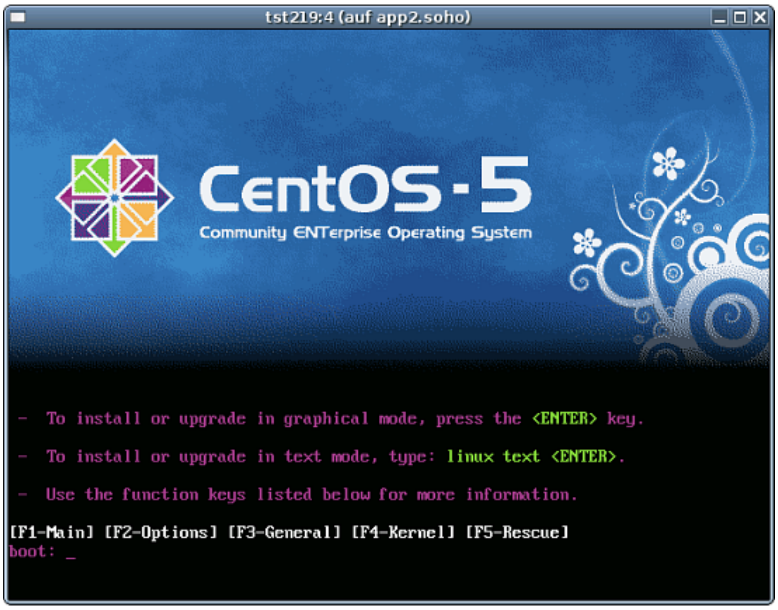
5. The installation could be started now e.g. on the install host by:

   ```
   ./tst219.sh --console=vnc  --vncaccessdisplay=47 --print --instmode
   ```

   Alternatively a remote call could be proceeded:

   ```
   ctys -t qemu -a create=l:tst219,b:${VMPATH},instmode app2
   ```

In case of appropriate defaults(refer to tst220.ctys) this starts e.g. the CD/DVD installation.



```
-  To install or upgrade in graphical mode, press the <ENTER> key.

-  To install or upgrade in text mode, type: linux text <ENTER>.

-  Use the function keys listed below for more information.

[F1-Main] [F2-Options] [F3-General] [F4-Kernel] [F5-Rescue]
boot: _
```

Figure 2: Start CentOS installation - CD/DVD

The following call with PXE is utilized here:

```
ctys \
   -t qemu \
   -a create=l:tst219,b:${VMPATH},instmode:PXE%default%HDD%default%init \
   app2
```

Resulting to:

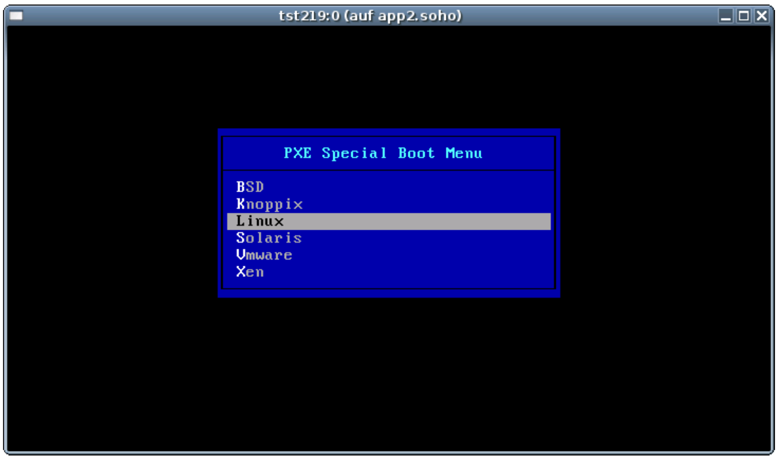


Figure 3: Start CentOS installation - PXE

6. Once the appropriate install kernel is choosen, the following procedure is the common install procedure as described later.

4.2 Creation of the Raw-VM with VirtualBox

The creation of the raw VM is first step to be executed at the host oeprating system. This could be either performed locally or remote and requires the usage of the provided tools by VirtualBox(TM).

1. Login into the machine where VirtualBox is installed.

   ```
   ssh -X lab02
   ```

2. Execute the VirtualBox(TM) console.

   ```
   VirtualBox
   ```

3. Create the VM, the machine is called here 'tst220'. When finished the raw VM is present and could be used as required, for basic functions of ctys no additional configuration is required.

   (a) The OS is 'Linux', the version is 'Linux 2.6'.

   (b) Set RAM to 512MByte.

   (c) Create a virtual HDD, here 8GByte is choosen.

4. When additional information is required to be stored coallocated to the VM and scanned automatically into a database, than the tool **ctys-createConfVM** should be applied. This generates additional detailed information related to the specific VM and the inherent guest OS. The call could be executed either interactive or automatic.

   Call within the same directory for first inspection:

   ```
   ctys-createConfVM -t vbox --label=tst137 --levo
   ```

   This lists some defaults for the specific hypervisor. These could be preconfigured by specific template files within the configuration directory **ctys-createConfVM.d**.

   The following call actually generates the appropriate configuration

   ```
   DIST=CentOS \
   DISTREL=5.5 \
   OS=Linux \
   OSREL=2.6 \
   MAC=00:50:56:13:12:14 \
   IP=172.20.2.20 \
   ARCH=x86_64 \
   ctys-createConfVM --label=tst220 -t vbox
   ```

   The result displayed with –**levo** is:

   ```
   Not all values require to be set, some will be requested later
   by dialogue.
   Thus it is not neccessary to have values assigned to the complete
   displayed set.


   Actually used sources for default values:
     no-marker  = Pre-Set value, either from defaults configuration,
                  or by commandline.
     no-value   = Either requested by dialog later, or the defaults
   ```

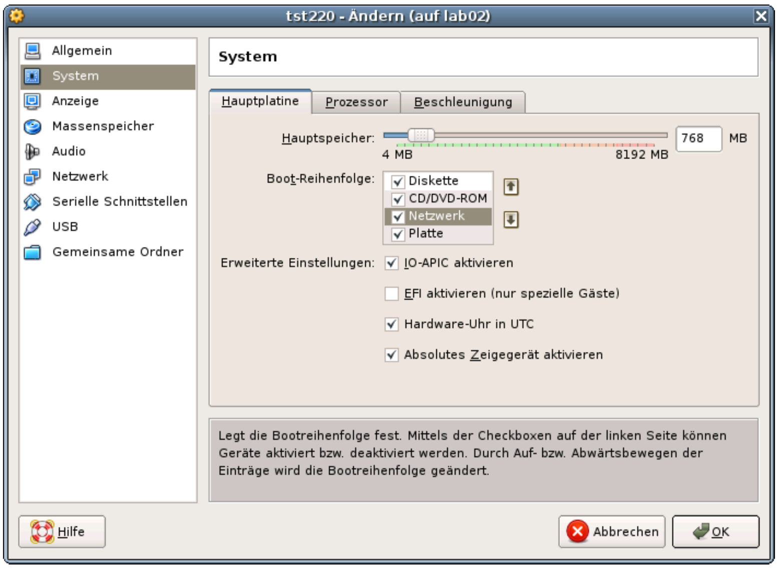
```
                 of the finally called
                 application are used.
  (c)          = Read from actual configuration file, e.g. vmx-file.
  (d)          = Read from database.
  (g)          = Dynamically generated.
  (h)          = Used from current host as default.
  (m)          = Received from mapping definitions.

Applicable modifications:
  blue         = By call option, defines dependency for others.
  green        = By environment, 'could be set almost independent'
                 from other values.
  cyan         = By miscellaneous facilities, but is dependent from
                 others.
                 E.g. LABEL defines by convention the network 'hostname',
                 thus the TCP/IP params.
                 This could ..., but should not be altered!

Most of the missing values will be fetched during actual execution of
this tool by dynamic evaluation.
```

```
                      VAR name:Initial Value

                 C_SESSIONTYPE:VBOX
                         LABEL:tst220
                           MAC:00:50:56:13:12:14 (c)
                            IP:172.20.2.20 (m)
                        BRIDGE:
                          DHCP:
                       NETMASK:
                           TCP:
                       GATEWAY:

                        EDITOR:acue

                          UUID:e982e0c4-2de8-40f1-aa6e-8c615096b37c (c)

                          DIST:debian (h)
                       DISTREL:5.5
                            OS:Linux
                         OSREL:2.6

                          ARCH:x86_64
                   ACCELERATOR:HVM  (c)
                           SMP:1 (c)
                       MEMSIZE:768 (c)
                    KBD_LAYOUT:de

                   STARTERCALL:/usr/bin/VirtualBox

               DEFAULTBOOTMODE:HDD

             DEFAULTINSTTARGET:/mntn/vmpool/vmpool05/vbox/test/...
                               ...tst-ctys/tst220/tst220.vdi
        HDDBOOTIMAGE_INST_SIZE:8192M

                       VMSTATE:ACTIVE
```

```
Remember that his is a draft pre-display of current defaults.
No consistency-checks for provided values are performed at this stage.
Some missing values are evaluated at a later stage dynamically.
```

When the call is finished the file 'tst137.ctys' with additional configuration information information is stored.

5. Add the install image as a bootable CD/DVD and set this as the boot device for the VM or use PXE. The procedures are identical after the boot of the kernel. This example uses PXE.



tst220 - Ändern (auf lab02)

System

Hauptplatine | Prozessor | Beschleunigung

Hauptspeicher: 768 MB (4 MB – 8192 MB)

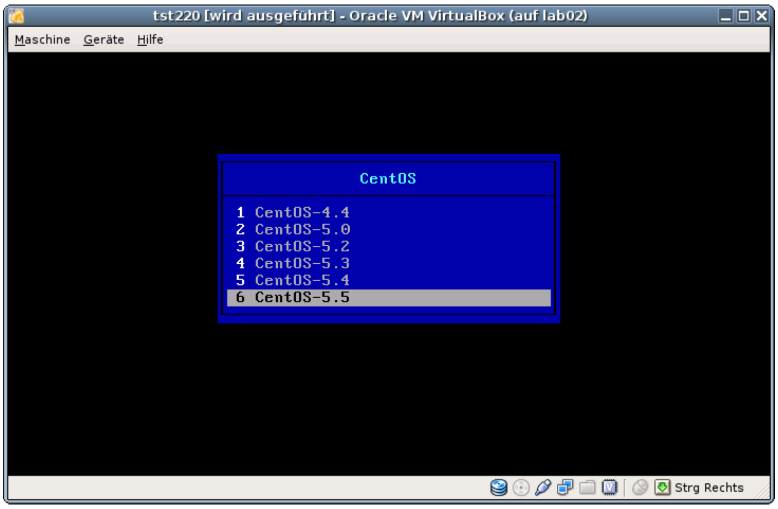
Boot-Reihenfolge:
☑ Diskette
☑ CD/DVD-ROM
☑ Netzwerk
☑ Platte

Erweiterte Einstellungen:
☑ IO-APIC aktivieren
□ EFI aktivieren (nur spezielle Gäste)
☑ Hardware-Uhr in UTC
☑ Absolutes Zeigegerät aktivieren

Legt die Bootreihenfolge fest. Mittels der Checkboxen auf der linken Seite können Geräte aktiviert bzw. deaktiviert werden. Durch Auf- bzw. Abwärtsbewegen der Einträge wird die Bootreihenfolge geändert.

Figure 4: Set PXE

Use network install of CentOS-5.5.



tst220 [wird ausgeführt] - Oracle VM VirtualBox (auf lab02)

```
CentOS

1 CentOS-4.4
2 CentOS-5.0
3 CentOS-5.2
4 CentOS-5.3
5 CentOS-5.4
6 CentOS-5.5
```

Figure 5: Set PXE

6. The start of actual CentOS-5.5 install procedure, from now on all post-bootstrap procedured are equal. Here the start from the VirtualBox console is choosen.

4.3 Creation of the Raw-VM with VMware-Server-1

ffs.

4.4 Creation of the Raw-VM with VMware-Server-2

The installation of raw machine is performed here by the native vendor supported tools. These could be started e.g. by using the X11 plugin and execution of a remote command. The advance is the transparent encryption on the inter-node connections by SSH. Ths e.g. in case of problems with the https port the unencrypted http GUI could still be used in a secure manner for network connections. All connections are tunneld by OpenSSH, here the X-displayforwarding with the '-X' option. The start of the VMW console for RHEL-5.5 and VMware Server-2.0.2 is:

```
ctys -t x11 -a create=l:vmwcon,cmd:vmware root@lab05
```

This starts the default fornt end, here the Firefox browser.

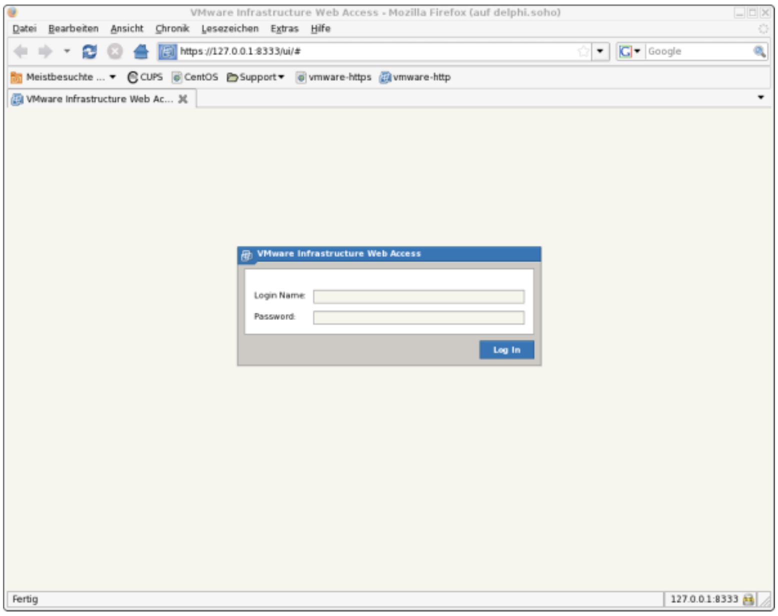
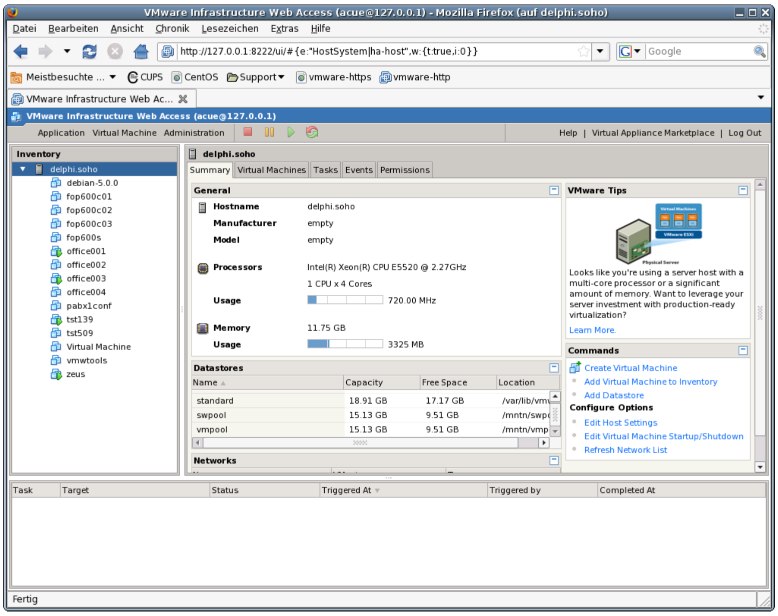

VMware Infrastructure Web Access - Mozilla Firefox (auf delphi.soho)
Datei Bearbeiten Ansicht Chronik Lesezeichen Extras Hilfe
https://127.0.0.1:8333/ui/#
Google
Meistbesuchte ...
CUPS
CentOS
Support
vmware-https
vmware-http
VMware Infrastructure Web Ac...
VMware Infrastructure Web Access
Login Name:
Password:
Log In
Fertig
127.0.0.1:8333

Figure 6: Start VMware Server Console

REMARK:
The current version of the **UnifiedSessiosnManager** requires by convention the coallocation of the VMX file and the boot HDD. Particularly the enumeration of VMs requires the presence of the VMX file. In some cases - for Server-2 when the allocation is altered from the defined storage - these are stored by default into different directories. This has to be considered for the allocation of new VMs.


VMware Infrastructure Web Access (acue@127.0.0.1) - Mozilla Firefox (auf delphi.soho)
Datei Bearbeiten Ansicht Chronik Lesezeichen Extras Hilfe
http://127.0.0.1:8222/ui/#{e:"HostSystem|ha-host",w:{t:true,i:0}}
Google
Meistbesuchte ... CUPS CentOS Support vmware-https vmware-http
VMware Infrastructure Web Ac...
VMware Infrastructure Web Access (acue@127.0.0.1)
Application Virtual Machine Administration
Help | Virtual Appliance Marketplace | Log Out
Inventory
delphi.soho
debian-5.0.0
fop600c01
fop600c02
fop600c03
fop600s
office001
office002
office003
office004
pabx1conf
tst139
tst509
Virtual Machine
vmwtools
zeus
Summary Virtual Machines Tasks Events Permissions
Commands
Create Virtual Machine
Add Virtual Machine to Inventory
Add Datastore
Configure Options
Edit Host Settings
Edit Virtual Machine Startup/Shutdown
Refresh Network List
Networks
Fertig

delphi.soho

General

Hostname delphi.soho
Manufacturer empty
Model empty
Processors Intel(R) Xeon(R) CPU E5520 @ 2.27GHz
1 CPU x 4 Cores
Usage 720.00 MHz
Memory 11.75 GB
Usage 3325 MB

Datastores

Name	Capacity	Free Space	Location
standard	18.91 GB	17.17 GB	/var/lib/vmw
swpool	15.13 GB	9.51 GB	/mntn/swp
vmpool	15.13 GB	9.51 GB	/mntn/vmp

VMware Tips

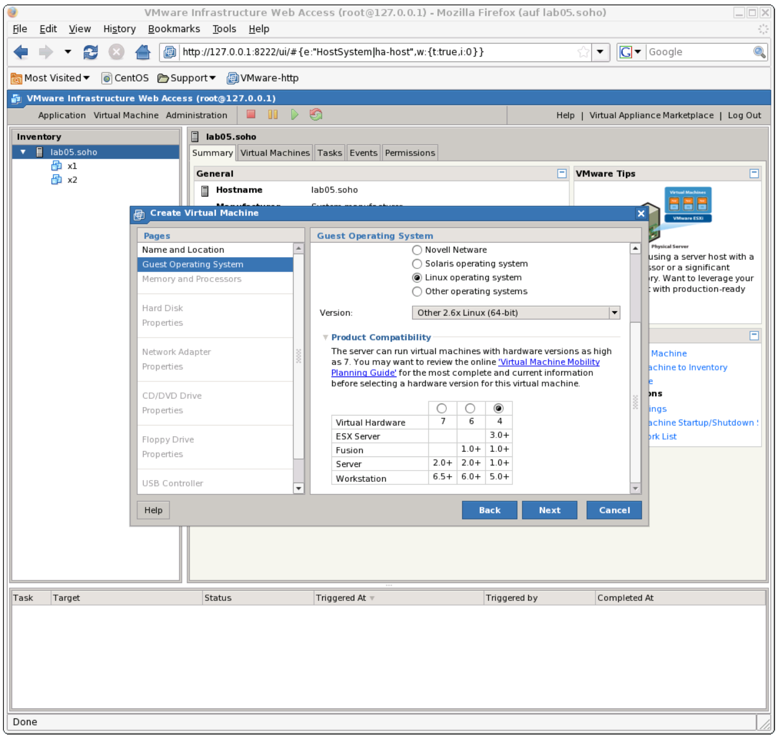
Looks like you're using a server host with a multi-core processor or a significant amount of memory. Want to leverage your server investment with production-ready virtualization?

Learn More.

Task	Target	Status	Triggered At	Triggered by	Completed At

Figure 7: VMware Server Console

The virtual machine should be selected as hardware version **4** when maximum compatibility is required.


VMware Infrastructure Web Access (root@127.0.0.1) - Mozilla Firefox (auf lab05.soho)
File Edit View History Bookmarks Tools Help
http://127.0.0.1:8222/ui/#{e:"HostSystem|ha-host",w:{t:true,i:0}}
Google
Most Visited CentOS Support VMware-http
VMware Infrastructure Web Access (root@127.0.0.1)
Application Virtual Machine Administration
Help | Virtual Appliance Marketplace | Log Out
Inventory
lab05.soho
x1
x2
Summary Virtual Machines Tasks Events Permissions
VMware Tips
Create Virtual Machine
Pages
Name and Location
Guest Operating System
Memory and Processors
Hard Disk
Properties
Network Adapter
Properties
CD/DVD Drive
Properties
Floppy Drive
Properties
USB Controller
Help
Back
Next
Cancel
Done

lab05.soho

General

Hostname lab05.soho

Guest Operating System

○ Novell Netware
○ Solaris operating system
● Linux operating system
○ Other operating systems

Version: Other 2.6x Linux (64-bit)

Product Compatibility

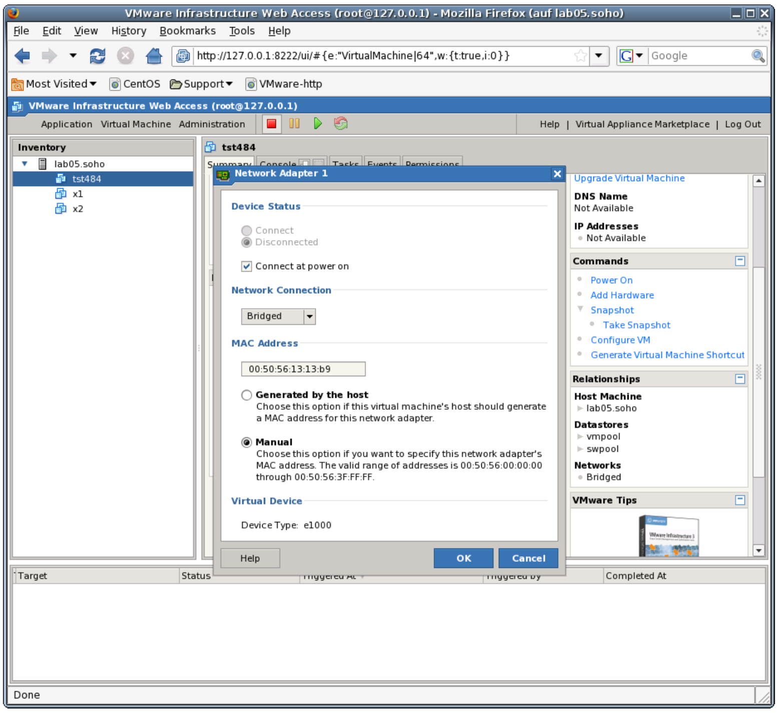
The server can run virtual machines with hardware versions as high as 7. You may want to review the online 'Virtual Machine Mobility Planning Guide' for the most complete and current information before selecting a hardware version for this virtual machine.

	○	○	●
Virtual Hardware	7	6	4
ESX Server			3.0+
Fusion		1.0+	1.0+
Server	2.0+	2.0+	1.0+
Workstation	6.5+	6.0+	5.0+

Task	Target	Status	Triggered At	Triggered by	Completed At

Figure 8: VMware Compatibility

For tight and vendor independent management of the VMs and PMs the MAC addresses should be assigned individually to each machine and centrally managed by DHCP.



VMware Infrastructure Web Access (root@127.0.0.1) - Mozilla Firefox (auf lab05.soho)
File Edit View History Bookmarks Tools Help
http://127.0.0.1:8222/ui/#{e:"VirtualMachine|64",w:{t:true,i:0}}
Google
Most Visited CentOS Support VMware-http
VMware Infrastructure Web Access (root@127.0.0.1)
Application Virtual Machine Administration
Help | Virtual Appliance Marketplace | Log Out
Inventory
lab05.soho
tst484
x1
x2
tst484
Summary Console Tasks Events Permissions
Upgrade Virtual Machine
DNS Name
Not Available
IP Addresses
Not Available
Commands
Power On
Add Hardware
Snapshot
Take Snapshot
Configure VM
Generate Virtual Machine Shortcut
Relationships
Host Machine
lab05.soho
Datastores
vmpool
swpool
Networks
Bridged
VMware Tips
Target Status Triggered At Triggered by Completed At
Done

Network Adapter 1

Device Status

○ Connect
● Disconnected

☑ Connect at power on

Network Connection

Bridged

MAC Address

00:50:56:13:13:b9

○ **Generated by the host**
Choose this option if this virtual machine's host should generate a MAC address for this network adapter.

● **Manual**
Choose this option if you want to specify this network adapter's MAC address. The valid range of addresses is 00:50:56:00:00:00 through 00:50:56:3F:FF:FF.

Virtual Device

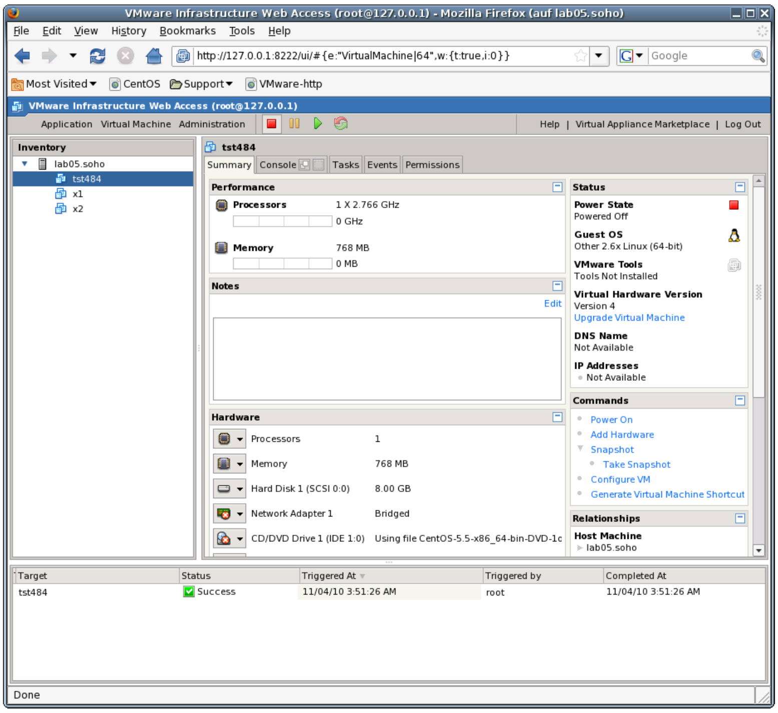
Device Type: e1000

Figure 9: VMware set MAC address

In addition the UUID of the VM should be set to fixed by maunal edition of the VMX file. This has advantages for unambiguity in networked operating environments. The UUID is part of the <**machine-address**> and therefore stored within the database and could be used for persistent addressing. Thus should not be changed by a harmless move, due to an algorithm for assurance of generic unambiguity.

Once the setup is finished by means of the vendor tools, the following steps of installation could be proceeded either continued solely by the vendor provided environment, or by application of the UnifiedSessionsManager toolset. The **instmode** for adaption of the actual boot configuration is not yet supported, thus a normal startup by management of boot and installmedia by the vendor products has to be applied.

The following operational procedures within the GuestOS are similar for all hypervisors. Just a few exceptions exist for installing specific driver sets - so called Tools available e.g. for almost all VMware(TM) products. These have to be mounted as install media and installed by the provided installer.


VMware Infrastructure Web Access (root@127.0.0.1) - Mozilla Firefox (auf lab05.soho)
File Edit View History Bookmarks Tools Help
http://127.0.0.1:8222/ui/#{e:"VirtualMachine|64",w:{t:true,i:0}}
Google
Most Visited CentOS Support VMware-http
VMware Infrastructure Web Access (root@127.0.0.1)
Application Virtual Machine Administration
Help | Virtual Appliance Marketplace | Log Out
Inventory
lab05.soho
tst484
x1
x2
tst484
Summary Console Tasks Events Permissions
Edit
Commands
Power On
Add Hardware
Snapshot
Take Snapshot
Configure VM
Generate Virtual Machine Shortcut
Done

Performance

Processors	1 X 2.766 GHz	0 GHz
Memory	768 MB	0 MB

Notes

Status

Power State
Powered Off

Guest OS
Other 2.6x Linux (64-bit)

VMware Tools
Tools Not Installed

Virtual Hardware Version
Version 4
Upgrade Virtual Machine

DNS Name
Not Available

IP Addresses
Not Available

Hardware

Processors	1
Memory	768 MB
Hard Disk 1 (SCSI 0:0)	8.00 GB
Network Adapter 1	Bridged
CD/DVD Drive 1 (IDE 1:0)	Using file CentOS-5.5-x86_64-bin-DVD-1c

Relationships

Host Machine
lab05.soho

Target	Status	Triggered At	Triggered by	Completed At
tst484	✓ Success	11/04/10 3:51:26 AM	root	11/04/10 3:51:26 AM

Figure 10: VMware Prepared VM

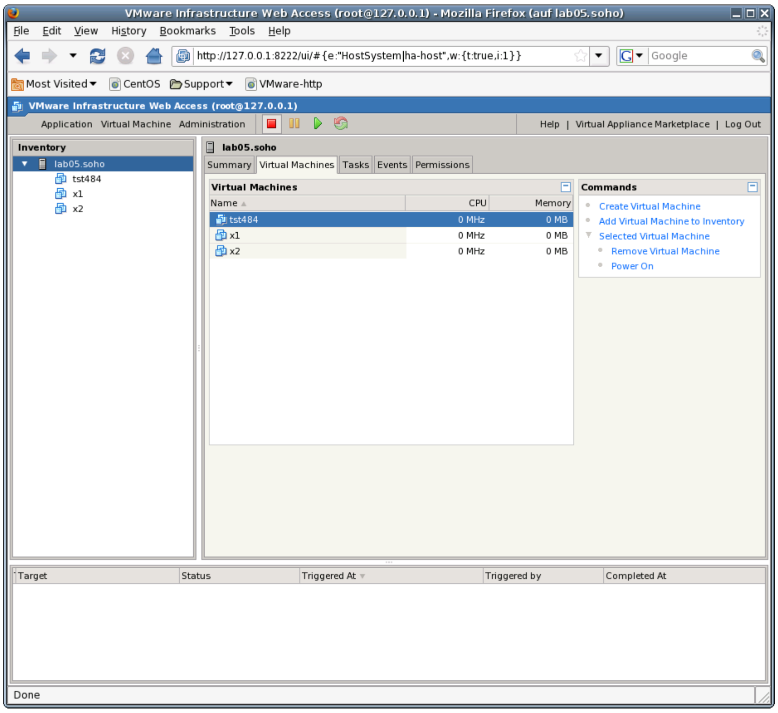
The following demonstrates the reallocation of the machine files to a common directory with the storage devices. The virtual HDD is stored within the directory

```
[Datastore] vmpool05/vmw/test/tst-ctys/tst484/tst484.vmdk
```

whereas the VM configuration files are stored by the system in the datastore to

```
[Datastore] tst484/...
```

1. Remove the VM tst488 without deletion.


VMware Infrastructure Web Access (root@127.0.0.1) - Mozilla Firefox (auf lab05.soho)
File Edit View History Bookmarks Tools Help
http://127.0.0.1:8222/ui/#{e:"HostSystem|ha-host",w:{t:true,i:1}}
Google
Most Visited
CentOS
Support
VMware-http
VMware Infrastructure Web Access (root@127.0.0.1)
Application Virtual Machine Administration
Help | Virtual Appliance Marketplace | Log Out
Inventory
lab05.soho
tst484
x1
x2
lab05.soho
Summary Virtual Machines Tasks Events Permissions
Commands
Create Virtual Machine
Add Virtual Machine to Inventory
Selected Virtual Machine
Remove Virtual Machine
Power On
Done

Virtual Machines

Name	CPU	Memory
tst484	0 MHz	0 MB
x1	0 MHz	0 MB
x2	0 MHz	0 MB

Target	Status	Triggered At	Triggered by	Completed At

Figure 11: Remove VM

2. Move the directory and concat all files within the same. Than check the filenames of storage devices within the VMX file, which are absolute filenamepaths anyway. Here:

   ```
   scsi0:0.fileName = "/mntn/vmpo ..."
   ide1:0.fileName = "/mntn/swpool/UNIXDist..."
   ```

3. Make the UUID static by:

   ```
   uuid.action = "keep"
   ```

4. Make the MAC address static by:

   - Delete:

     ```
     ethernet0.addressType = "generated"
     ethernet0.generatedAddress = "00:0c:29:9c:6a:6a"
     ```

   - Add:

     ```
     ethernet0.addressType = "static"
     ethernet0.address = "00:50:56:13:11:33"
     ```

5. Adapt - if required -

   ```
   displayName = "tst484"
   ```

   which is the so called **LABEL**.

For the management of the GuestOSs and integration into the database of the UnifiedSessionsManager the inventory functions by **ctys-createConfVM** and **ctys-vdbgen** should be at least post-applied once after finishing the guest installation.

The installed GuestOS is here the same as the HostOS, with the only difference, that the architecture has to be set to 'ARCH=i386'. This reduces the call for configuration creation to:

```
ARCH=i386 ctys-createConfVM -t vmw --label=tst484
```

The –**levo** display is:

```
Not all values require to be set, some will be requested later by dialogue.
Thus it is not neccessary to have values assigned to the complete displayed set.


Actually used sources for default values:
  no-marker  = Pre-Set value, either from defaults configuration,
               or by commandline.
  no-value   = Either requested by dialog later, or the defaults
               of the finally called
               application are used.
  (c)        = Read from actual configuration file, e.g. vmx-file.
  (d)        = Read from database.
  (g)        = Dynamically generated.
  (h)        = Used from current host as default.
  (m)        = Received from mapping definitions.

Applicable modifications:
  blue       = By call option, defines dependency for others.
  green      = By environment, 'could be set almost independent'
               from other values.
  cyan       = By miscellaneous facilities, but is dependent from others.
               E.g. LABEL defines by convention the network 'hostname',
               thus the TCP/IP params.
               This could ..., but should not be altered!

Most of the missing values will be fetched during actual execution of
this tool by dynamic evaluation.


                   VAR name:Initial Value

                      LABEL:tst484
                        MAC:00:50:56:13:13:B9 (c)
                         IP:172.20.6.184 (m)
                     BRIDGE:
                       DHCP:
                    NETMASK:
                        TCP:tst484 (m)
                    GATEWAY:

                     EDITOR:acue

                       UUID:564d99fb5a6c2897edce5b14279c6a6a (c)

                       DIST:CentOS (h)
                    DISTREL:5.5 (h)
                         OS:Linux (h)
                      OSREL:2.6.18-194.el5 (h)

                       ARCH:x86_64 (h)
                ACCELERATOR:
                        SMP:
                    MEMSIZE:768 (c)
```

```
                 KBD_LAYOUT:de

                STARTERCALL:/usr/bin/vmware


                    VMSTATE:ACTIVE


Remember that his is a draft pre-display of current defaults.
No consistency-checks for provided values are performed at this stage.
Some missing values are evaluated at a later stage dynamically.
```

The result could be inspected e.g. by the following call with one of the standard macros. Called within the directory of the VM, therefore starting at the scan-base 'b:$PWD'.

```
ctys -t vmw "{MACRO:enumdefault},b:$PWD"
```

Resulting in the output:

```
label |stype|accel|distro|distrorel|os   |osrel     |PM        |if|TCP
------+-----+-----+------+---------+-----+----------+----------+--+------------
tst484|VMW  |     |CentOS|5.5      |Linux|2.6.18-194|lab05.soho|0 |172.20.6.184
```

4.5 Creation of the Raw-VM with VMware-Player

ffs.

4.6 Creation of the Raw-VM with VMware-Workstation

ffs.

4.7 Creation of the Raw-VM with VMware-ESXi

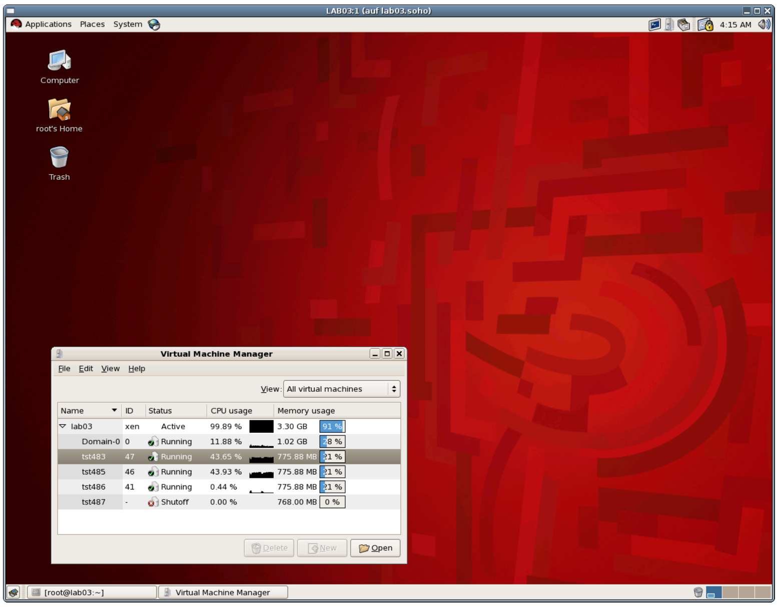
ffs.

4.8 Creation of the Raw-VM with VMware-ESX

ffs.

4.9 Creation of the Raw-VM with Xen

The examples for installaltion of Xen GuestOSs are performed here on a RedHat-Enterprise-Linux - RHEL-5.5 server. The procedures are almost identicel to other derived distributions, e.g. CentOS, ScientificLinux, or EnterpriseLinux.



Name	ID	Status	CPU usage	Memory usage	
lab03	xen	Active	99.89 %	3.30 GB	91 %
Domain-0	0	Running	11.88 %	1.02 GB	28 %
tst483	47	Running	43.65 %	775.88 MB	21 %
tst485	46	Running	43.93 %	775.88 MB	21 %
tst486	41	Running	0.44 %	775.88 MB	21 %
tst487	-	Shutoff	0.00 %	768.00 MB	0 %

Figure 12: Remove VM

The Xen files, including the Python conf-file and the initial virtual devices are created by the utility **ctys-createConfVM**. Thus e.g. the MAC address has to be provided when networking is required. In some cases - e.g. for OpenSUSE or debian - it might be required to provide the virtual bridge too. This is due to internal detection a so called Xen-Bridge by searching for the first bridge containing a 'pethX' device, which sometimes varies. E.g. for debian the bridge is called in some releases simply 'eth0'. Thus when errors with networking due to missing bridge occurs, than just set an appropriate default. If this still does not suffice, than the variable 'FORCE_THIS_IS_XEN_BRIDGE=br0' may help. But be aware, when the machine is executed on different machines with various HostOSs, e.g. viy NFS. Than the bridge names may vary, and may require to be adapted. This is the reason of dynamic evaluation for the networking devices.

Now execute the call for the complete creation of the VM.

```
MAC=00:50:56:13:13:B7 \
DIST=CentOS \
DISTREL=5.5 \
OS=Linux \
OSREL=2.6.18 \
ctys-createConfVM -t XEN --label=tst482
```

This creates with the –**levo** check the output:

```
Not all values require to be set, some will be requested later by dialogue.
Thus it is not neccessary to have values assigned to the complete displayed set.


Actually used sources for default values:
  no-marker  = Pre-Set value, either from defaults configuration,
               or by commandline.
  no-value   = Either requested by dialog later, or the defaults
               of the finally called
               application are used.
  (c)        = Read from actual configuration file, e.g. vmx-file.
  (d)        = Read from database.
  (g)        = Dynamically generated.
  (h)        = Used from current host as default.
  (m)        = Received from mapping definitions.

Applicable modifications:
  blue       = By call option, defines dependency for others.
  green      = By environment, 'could be set almost independent'
               from other values.
  cyan       = By miscellaneous facilities, but is dependent from others.
               E.g. LABEL defines by convention the network 'hostname',
               thus the TCP/IP params.
               This could ..., but should not be altered!

Most of the missing values will be fetched during actual execution of
this tool by dynamic evaluation.


                   VAR name:Initial Value
               C_SESSIONTYPE:XEN
                      LABEL:tst482
                        MAC:00:50:56:13:13:B7
                         IP:172.20.6.182 (m)
                     BRIDGE:
                       DHCP:
                    NETMASK:
                        TCP:tst482 (m)
                    GATEWAY:

                     EDITOR:acue

                       UUID:e589efe5-5fe5-4de8-890c-43484b5a64e4 (h)

                       DIST:CentOS
                    DISTREL:5.5
                         OS:Linux
                      OSREL:2.6.18
                       ARCH:x86_64 (h)
                ACCELERATOR:HVM  (h)
                        SMP:1
                    MEMSIZE:768
                 KBD_LAYOUT:de

                STARTERCALL:/usr/sbin/xm
                WRAPPERCALL:/usr/bin/sudo.sh

            DEFAULTBOOTMODE:HDD

          DEFAULTINSTTARGET:/mntn/vmpool/vmpool05/xen/test/tst-ctys/tst482/xvda.img
     HDDBOOTIMAGE_INST_SIZE:8G
HDDBOOTIMAGE_INST_BLOCKSIZE:256M
DDBOOTIMAGE_INST_BLOCKCOUNT:32
  HDDBOOTIMAGE_INST_BALLOON:y

            DEFAULTINSTMODE:CD
               INSTSRCCDROM:/mntn/swpool/UNIXDist/centOS/5.5/inst/isos/...
                            ...x86_64/CentOS-5.5-x86_64-bin-DVD-1of2.iso
          DEFAULTINSTSOURCE:/mntn/swpool/UNIXDist/centOS/5.5/inst/isos/...
                            ...x86_64/CentOS-5.5-x86_64-bin-DVD-1of2.iso
```

```
                  BOOTLOADER:/usr/lib/xen/boot/hvmloader
                 INST_KERNEL:/usr/lib/xen/boot/hvmloader

                     VMSTATE:ACTIVE


Remember that his is a draft pre-display of current defaults.
No consistency-checks for provided values are performed at this stage.
Some missing values are evaluated at a later stage dynamically.
```

The following call starts the initial installation of the VM:

```
ctys -t xen -a create=l:tst482,reuse,b:$PWD,instmode root@lab03
```

4.10 Creation of the Raw-VM with XenServer

ffs.

5 Installation of the GuestOS - CentOS

1. Install CentOS-5.5. The following steps are almost identical to all hypervisors. The few exceptions are depicted when required, e.g. change of the QEMU/KVM reboot mode after installation.
2. From now on for the tests the default settings are used, just the network interfaces are changed to DHCP.

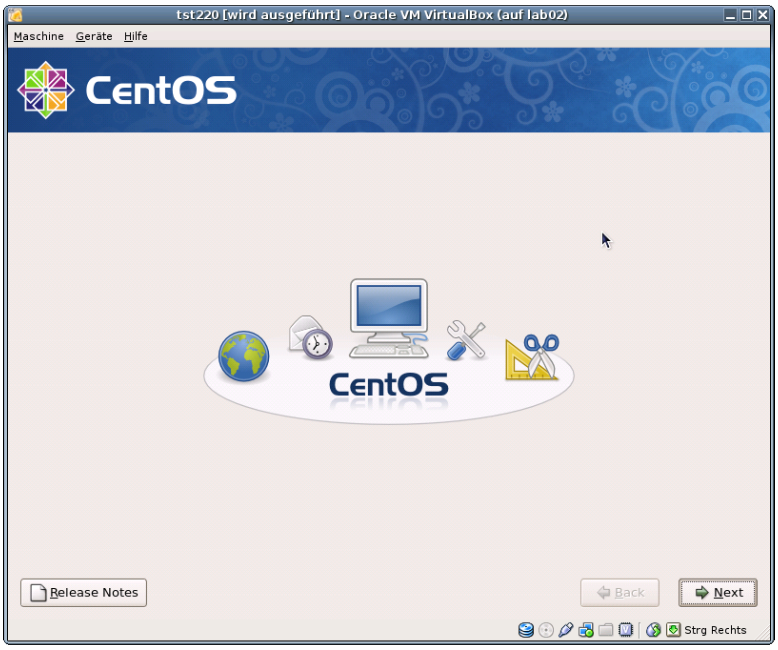
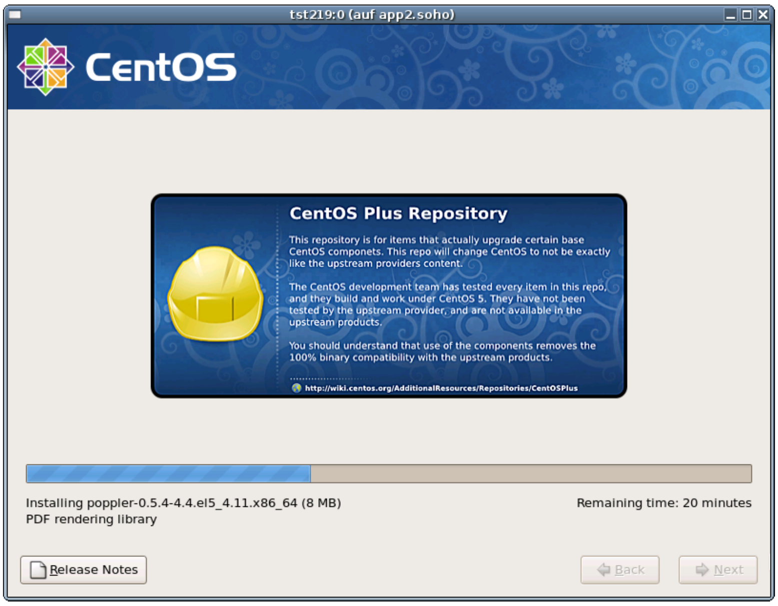


Figure 13: Start CentOS installation - Anaconda



CentOS Plus Repository

This repository is for items that actually upgrade certain base CentOS componets. This repo will change CentOS to not be exactly like the upstream providers content.

The CentOS development team has tested every item in this repo, and they build and work under CentOS 5. They have not been tested by the upstream provider, and are not available in the upstream products.

You should understand that use of the components removes the 100% binary compatibility with the upstream products.

http://wiki.centos.org/AdditionalResources/Repositories/CentOSPlus

Installing poppler-0.5.4-4.4.el5_4.11.x86_64 (8 MB)
PDF rendering library

Remaining time: 20 minutes

Figure 14: Proceed CentOS installation

Once the installation is completed for QEMU/KVM the boot mode has to be changed. This could be either processed completely within the so called monitor, or just by rebooting without the 'instmode' suboption. Therefore either change into the monitor mode by typing **Ctrl-Alt-2** and the **quit** command, or by the CANCEL call, The close of the defualt VNC console only will not stop the server:

```
ctys -t qemu -a cancel=l:tst219,b:${VMDIRECTORYPATH},poweroff app2
```

The syntax for this is similar for all supported hypervisors.

The following call starts the VM into standard operations.

```
ctys -t qemu -a create=l:tst219,b:${VMDIRECTORYPATH}  app2
```

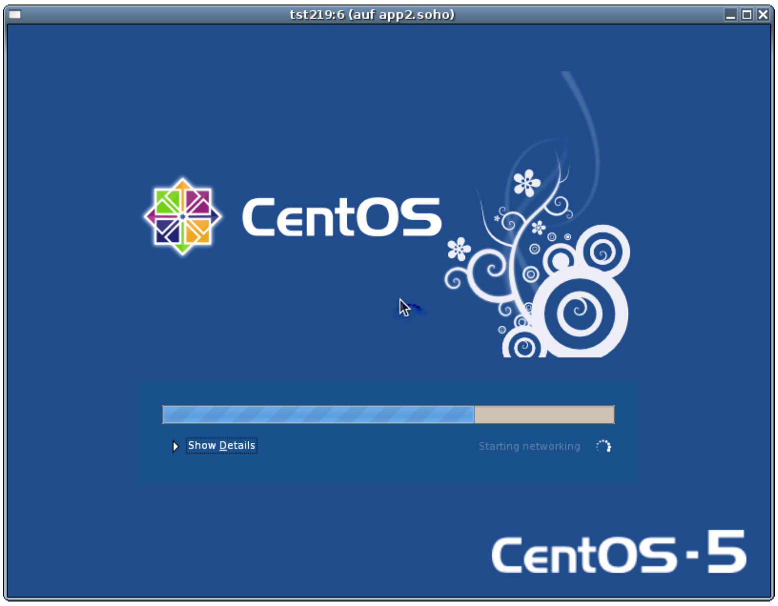
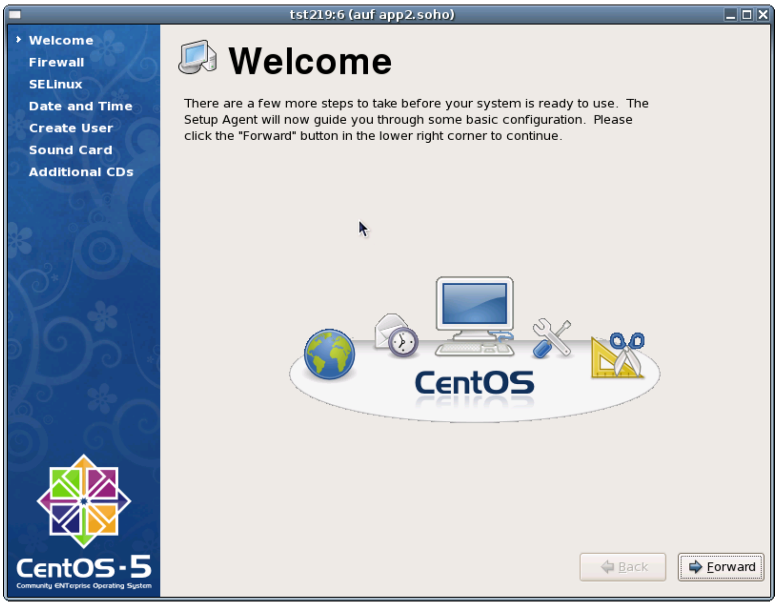


Figure 15: Proceed CentOS installation

The machine now starts into the firstboot mode, where some basic system settings has to beset.

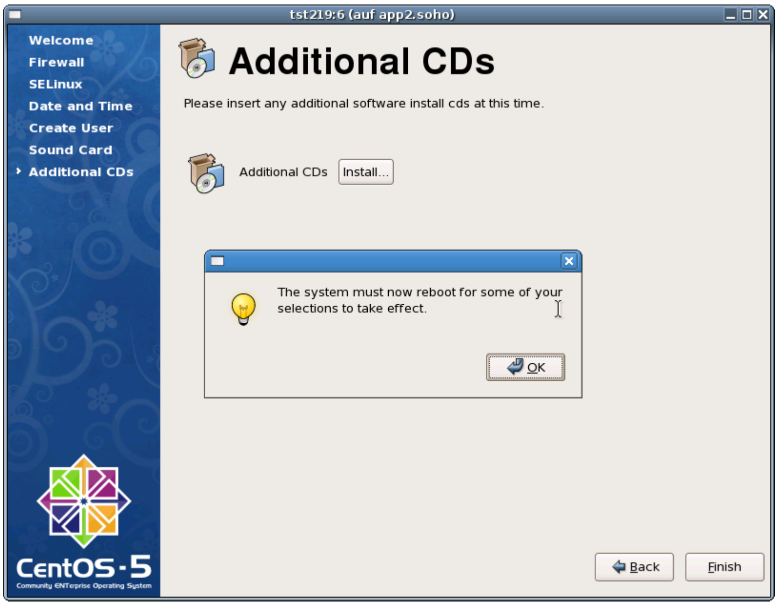


Welcome

There are a few more steps to take before your system is ready to use. The Setup Agent will now guide you through some basic configuration. Please click the "Forward" button in the lower right corner to continue.

Figure 16: CentOS firstboot

Once the basic post-install configuration is finished the machine reboots into the normal operations mode.



Additional CDs

Please insert any additional software install cds at this time.

Additional CDs

The system must now reboot for some of your selections to take effect.

Figure 17: Finish post-install

Figure 18: Proceed CentOS operational boot

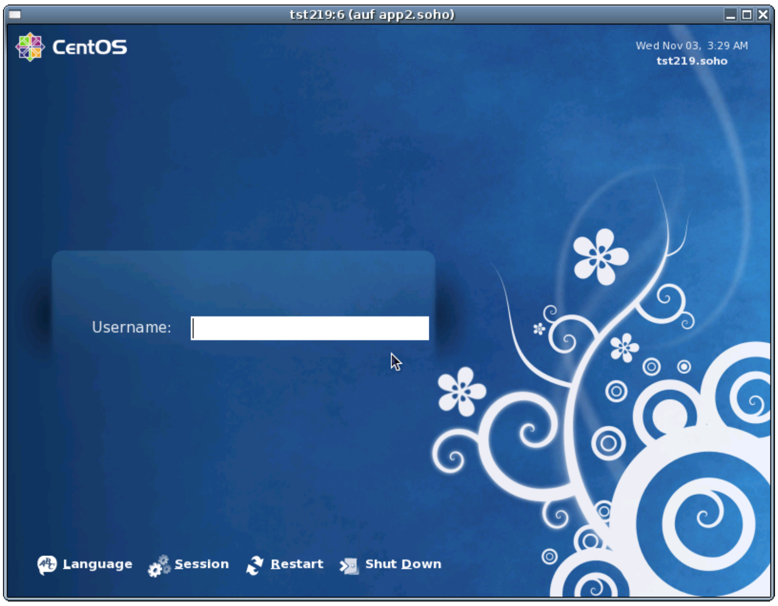


Figure 19: Final Login

6 Creation of the Inventory - cacheDB

In case of a common mounted NFS filesystem for the pool VMs for simplicity just change into the directory of the VM on any machine. Call for the first check **ctys-vdbgen** with the –**stdio** option for display only.

```
ctys-vdbgen --append --base=$PWD --stdio -- lab02
```

When the result is displyed correctly just call

```
ctys-vdbgen --append --base=$PWD -- lab02
```

The following output should be displayed:

```
Prepare execution-call:

Require DB-PATH,         USE: DEFAULT_DBPATHLST="/homen/acue/.ctys/db/default"
Require DB-PATH,         USE: -o => "/homen/acue/.ctys/db/default"
APPEND mode                 : ON(1)
STDIO mode off              : OFF(0)
Set TYPE scope           ADD: DEFAULT="-t ALL"
Preload TYPE set         ADD: DEFAULT="-T ALL"
For splitted operations ADD: DEFAULT="-b sync,seq "
Nameservice cache        OFF: DEFAULT="-c off "
Data cache               OFF: DEFAULT="-C off "

Resulting ENUMERATE      ADD: DEFAULT="-a enumerate=...
    ...matchvstat:active%disabled%empty,machine,\
    b:/mntn/vmpool/vmpool05/vbox/test/tst-ctys/tst137 \
    -C off  -c off  -T ALL  "

-> generate DB(may take a while)...
-----------------------------------
START:08:38:35
------



------
END:08:39:03
DURATION:00:00:28
-----------------------------------
RET=0
-----------------------------------

Cached data:

  Mode:                     APPEND
  Pre-Appended:             834 records
  Appended:                 1 records
  Fetched Records Raw:       records
  Fetched Records Unique:    records
  Final:                    835 records

-----------------------------------
   ...finished.
```

This shows that only one entry is appended to the existing database with 834 VM-Entries. Now check the database entry by calling:

```
ctys-vhost tst137
```

The following result should be displayed:

```
label |stype|accel|distro|distrorel|os   |osrel|PM   |if |TCP
------+-----+-----+------+---------+-----+-----+-----+---+------------
tst137|VBOX |     |CentOS|1.0.0    |Linux|2.6  |lab02|0  |172.20.2.241
```

7 Graphical Start of the Virtual Machine

Now call the menue item for start of the VM 'tst137'.

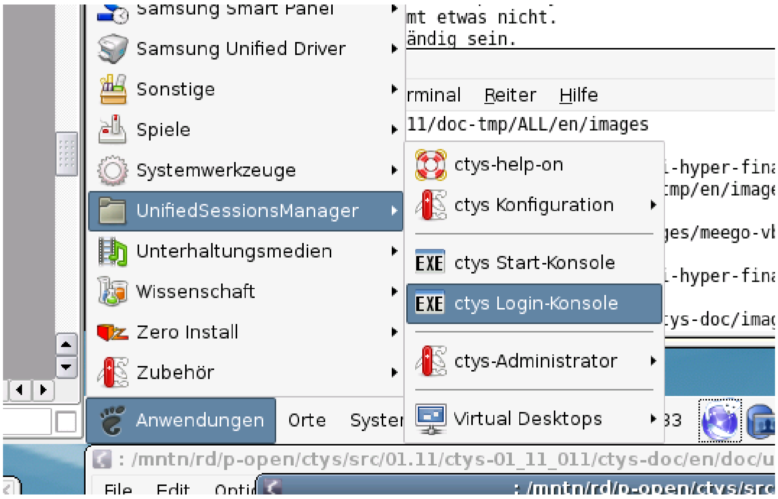
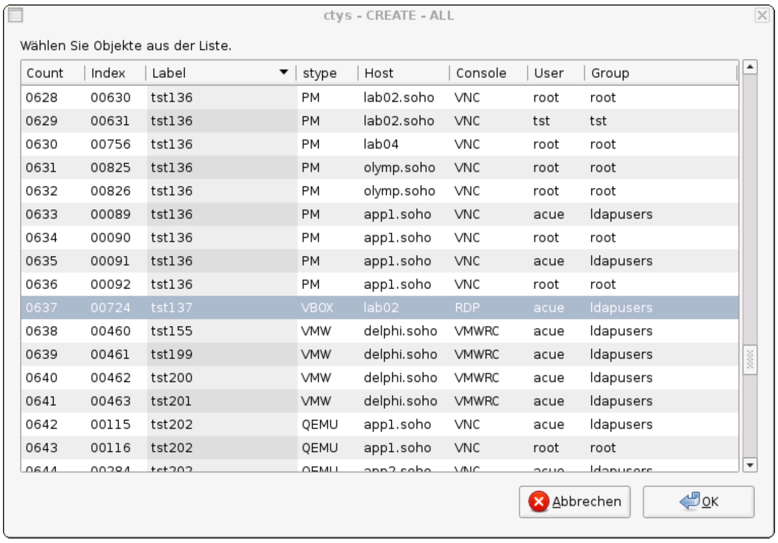


Figure 20: CentOS Start Menu

The created cacheDB record for thr VM 'tst137' is now automatically visible in the list of startable virtual machines.

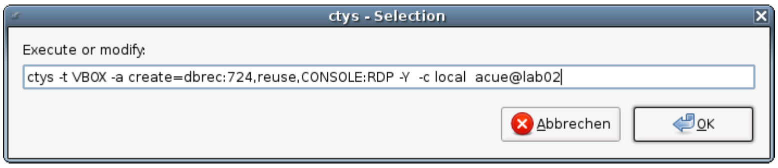


Wählen Sie Objekte aus der Liste.

Count	Index	Label	stype	Host	Console	User	Group
0628	00630	tst136	PM	lab02.soho	VNC	root	root
0629	00631	tst136	PM	lab02.soho	VNC	tst	tst
0630	00756	tst136	PM	lab04	VNC	root	root
0631	00825	tst136	PM	olymp.soho	VNC	root	root
0632	00826	tst136	PM	olymp.soho	VNC	root	root
0633	00089	tst136	PM	appl.soho	VNC	acue	ldapusers
0634	00090	tst136	PM	appl.soho	VNC	root	root
0635	00091	tst136	PM	appl.soho	VNC	acue	ldapusers
0636	00092	tst136	PM	appl.soho	VNC	root	root
0637	00724	tst137	VBOX	lab02	RDP	acue	ldapusers
0638	00460	tst155	VMW	delphi.soho	VMWRC	acue	ldapusers
0639	00461	tst199	VMW	delphi.soho	VMWRC	acue	ldapusers
0640	00462	tst200	VMW	delphi.soho	VMWRC	acue	ldapusers
0641	00463	tst201	VMW	delphi.soho	VMWRC	acue	ldapusers
0642	00115	tst202	QEMU	appl.soho	VNC	acue	ldapusers
0643	00116	tst202	QEMU	appl.soho	VNC	root	root
0644	00284	tst203	QEMU	app2.soho	VNC	acue	ldapusers

Figure 21: CentOS VM Selection

Confirm the selected entry.



Execute or modify:

```
ctys -t VBOX -a create=dbrec:724,reuse,CONSOLE:RDP -Y  -c local  acue@lab02
```

Figure 22: CentOS Call Confirmation

8 Manage the VM

8.1 Common Syntax

8.2 Prepare CentOS

Set yum repository in '/etc/yum.repo.d/'

Install the following additional Packages:

openssh-server

make

gcc

kernel-devel

kernel-netbook-devel

Almost absolutely required is a Single-Sign-On facility for OpenSSH. This is due to the required multiple remote remote calls for a number of operational modes. Recommended is either the usage of SSH-Keys, or Kerberos by GSSAPI.

8.3 Install UnifiedSessionsManager in GuestOS - CentOS

Apply standard procedure:

```
ctys-distribute -F 2 -P UserHomeCopy root@tst137
```

8.4 Open a Remote CLI-Terminal

Call CLI plugin:

```
ctys -t cli -a create=l:tst137 root@tst137
```

8.5 Check Plugins States

Call ctys-plugins:

```
ctys-plugins -T all -E
```

8.6 Open a Remote RDP-Desktop

ffs.

8.7 Open a Remote VNC-Desktop

Call VNC plugin:

```
ctys -t vnc -a create=l:tst137,reuse root@tst137
```

8.8 Open a Remote X11-Terminal

Call VNC plugin:

```
ctys -t x11 -a create=l:tst137,reuse root@tst137
```

9 SEE ALSO

ctys-configuration-QEMU(7) , *ctys-configuration-VBOX(7)* , *ctys-createConfVM(1)* , *ctys-plugins(1)* , *ctys-QEMU(1)* , *ctys-uc-QEMU(7)* , *ctys-uc-VBOX(7)* , *ctys-vhost(1)* , *ctys-uc-VMW(7)* , *ctys-VBOX(1)* , *ctys-VMW(1)* , *vmware(1)*
For System Tools:
CentOS: [http://www.centos.org]
RedHat(TM): [http://www.redhat.com]

10 AUTHOR

Maintenance:	<acue_sf1@sourceforge.net>
Homepage:	<http://www.UnifiedSessionsManager.org>
Sourceforge.net:	<http://sourceforge.net/projects/ctys>
Berlios.de:	<http://ctys.berlios.de>
Commercial:	<http://www.i4p.com>

11 COPYRIGHT