

SO301 - System Installation

Introduction

Solaris 11 was introduced in november 2011 by Oracle who purchased Sun Microsystems in early 2010. Solaris 11 is greatly inspired by Sun's Solaris 10 OS, introduced in 2005 combined with work from the OpenSolaris Community.

Solaris 10 was a major development in Operating Systems and introduced a number of innovative capabilities including:

- Fault and Service Management,
- Multiprocessor/Multicore performance scalability,
- The ZFS filesystem,
- Enhanced security with RBAC (Role Based Access Control),
- Virtualization with zones (also called containers),
- Hypervisor-based virtualisation for SPARC processors.

Solaris 11 introduces yet more capabilities as well as addressing those areas where Solaris 10 was weak (such as package management) compared to OSs such as Linux:

- The Image Packaging System (IPS),
- Simpler Automated Installation with AI, replacing jumpstart,
- Network virtualisation,
- Built-in CIFS support,
- Security enhancements,
- New ZFS features,
- CUPS
- Distribution Constructor,
- Boot environments,
- New container features,
- NIC auto-detection,
- Enhanced Multicore processor support.

Installation

Solaris 11 can be installed from one of three ISO images :

Method	Description
Text Install	CD sized ISO which can be used on both x86 and SPARC platforms to install a text only operating system.
Automated Installer	Same as above but also supports hands-free network-based minimal installations.
Live Media	DVD sized ISO which boots into a live x86 version of Solaris 11 containing the installation program.

This training module concentrates on the **Text Install** and **Live Media** methods of installation.

The minimum hardware specifications for Solaris 11 are as follows :

Hardware	SPARC	x86 (64-bit ONLY)
Processor Achitecture	Sun 4v (T Series) , SPARC 64	Intel Xeon, i3, i5, i7, AMD Opteron
Minimum Memory	1GB	1GB
Recommended Memory	1GB	1GB
Minimum Disk Space	Text Install: 2.9GB, Automated Installer: 2.5GB, Live Media: 5GB	Text Install: 2.9GB, Automated Installer: 2.5GB, Live Media: 5GB
Recommended Disk Space	Text Install: 4.9GB, Automated Installer: 13GB, Live Media: 7GB	Text Install: 4,9GB, Automated Installer: 13GB, Live Media: 7GB

Oracle's Hardware Compatibility List is available at their HCL web site: <http://www.oracle.com/webfolder/technetwork/hcl/index.html>.

Preparing for Installation

Dual Boot Environments

If you intend to install Solaris 11 alongside Linux:

- Deactivate the Linux swap partition under Linux before proceeding further. This is necessary because the swap partition is seen by Solaris 11 as **Linux Swap / Solaris** and therefore Solaris 11 will try to use it as a native Solaris partition,
- Note that you **must** use the Solaris 11 version of the bootloader **grub**. This is because the Solaris 11 grub has been enhanced to be able to boot both Solaris and Linux whereas the Linux version of grub **cannot** boot Solaris. You **must** copy the Linux boot stanza from the Linux grub configuration before installing Solaris so that you can paste it into the Solaris grub configuration,
- If you need to free up disk space on a Linux installation in order to install Solaris 11, you should use the Live Media installation process since it contains the **gparted** program that you will need to use prior to installing Solaris 11.

If you intend to install Solaris 11 alongside Windows™:

- You should use the native Windows™ disk management tools to free up space.

Virtualisation

Solaris 11 can be installed as a virtual appliance on many hypervisor applications :

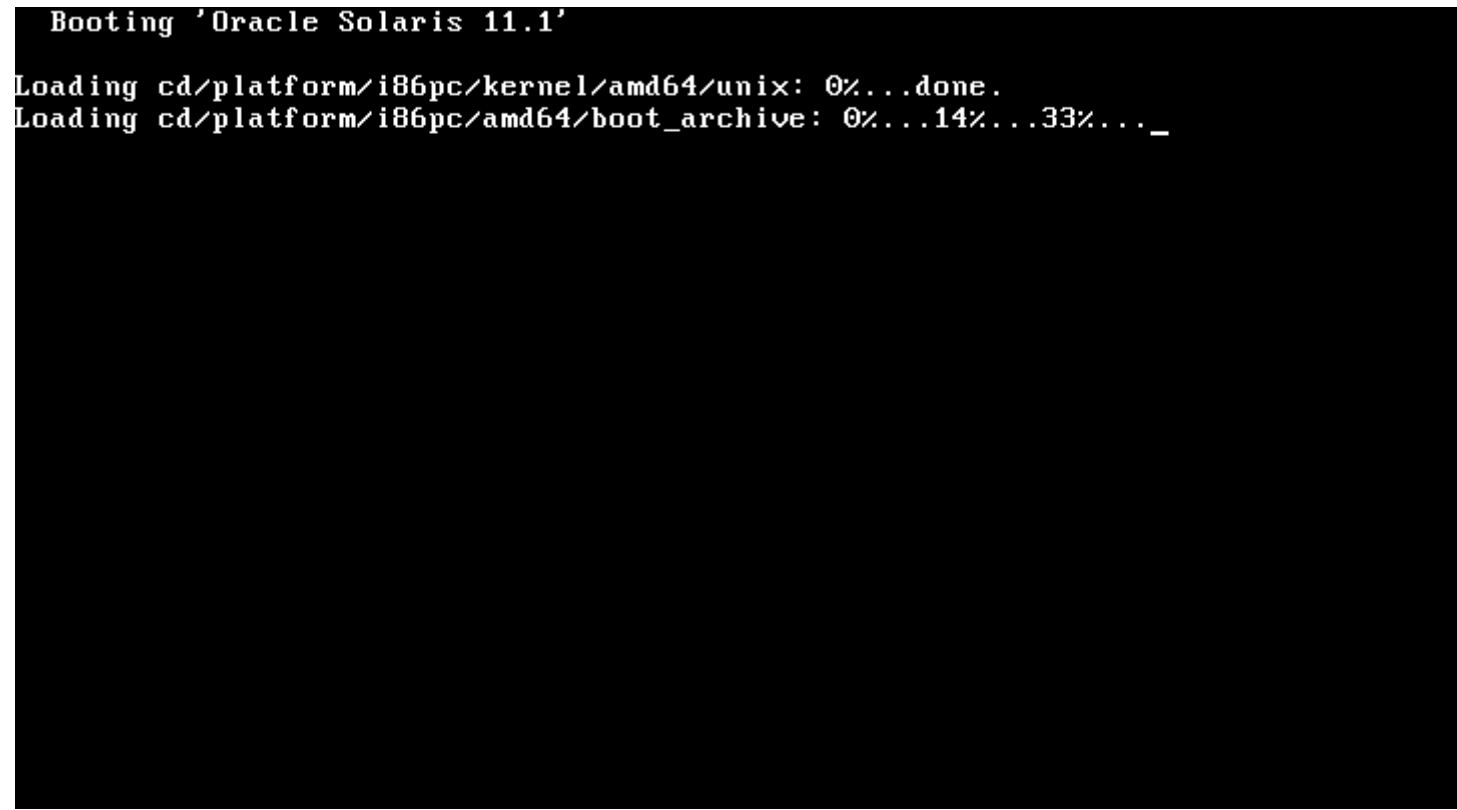
- Oracle VirtualBox,
- Oracle VM for x86,
- Oracle VM Server for SPARC,
- VMware vSphere 5.1,
- Xen,
- Citrix XenServer.

During this course you will be using the Oracle VirtualBox application to install and use Solaris 11.

LAB #1 - Installing via Text Install

Create a new virtual machine in VirtualBox with a 20GB **vmdk** hard disk and 2048MB of RAM.

Start the new machine and tell it to boot the Text Install ISO:

A screenshot of a terminal window showing the boot progress of Oracle Solaris 11.1. The text is white on a black background. It shows the system is booting 'Oracle Solaris 11.1', loading the kernel, and then loading the boot archive with a progress indicator.

```
Booting 'Oracle Solaris 11.1'  
Loading cd/platform/i86pc/kernel/amd64/unix: 0%...done.  
Loading cd/platform/i86pc/amd64/boot_archive: 0%...14%...33%..._
```

The process then starts to probe for devices:

```
SunOS Release 5.11 Version 11.1 64-bit  
Copyright (c) 1983, 2012, Oracle and/or its affiliates. All rights reserved.  
Remounting root read/write  
Probing for device nodes ...  
█
```

The system now prompts you to choose a keyboard layout:

```
SunOS Release 5.11 Version 11.1 64-bit
Copyright (c) 1983, 2012, Oracle and/or its affiliates. All rights reserved.
Remounting root read/write
Probing for device nodes ...
Preparing image for use
Done mounting image
USB keyboard
 1. Arabic
 2. Belgian
 3. Brazilian
 4. Canadian-Bilingual
 5. Canadian-French
 6. Danish
 7. Dutch
 8. Dvorak
 9. Finnish
10. French
11. German
12. Italian
13. Japanese-type6
14. Japanese
15. Korean
16. Latin-American
17. Norwegian
18. Portuguese
19. Russian
20. Spanish
21. Swedish
22. Swiss-French
23. Swiss-German
24. Traditional-Chinese
25. TurkishQ
26. UK-English
27. US-English
To select the keyboard layout, enter a number [default 27]:
```

Followed by the choice of the installation language:

USB keyboard

- | | |
|-----------------------|-------------------------|
| 1. Arabic | 15. Korean |
| 2. Belgian | 16. Latin-American |
| 3. Brazilian | 17. Norwegian |
| 4. Canadian-Bilingual | 18. Portuguese |
| 5. Canadian-French | 19. Russian |
| 6. Danish | 20. Spanish |
| 7. Dutch | 21. Swedish |
| 8. Dvorak | 22. Swiss-French |
| 9. Finnish | 23. Swiss-German |
| 10. French | 24. Traditional-Chinese |
| 11. German | 25. TurkishQ |
| 12. Italian | 26. UK-English |
| 13. Japanese-type6 | 27. US-English |
| 14. Japanese | |

To select the keyboard layout, enter a number [default 27]:10

1. Chinese - Simplified
2. Chinese - Traditional
3. English
4. French
5. German
6. Italian
7. Japanese
8. Korean
9. Portuguese - Brazil
10. Spanish

To select the language you wish to use, enter a number [default is 3]: █

The system is now ready to be installed. Choose the default value of **1** and hit

```
Welcome to the Oracle Solaris installation menu
```

- 1 Install Oracle Solaris
- 2 Install Additional Drivers
- 3 Shell
- 4 Terminal type (currently sun-color)
- 5 Reboot

```
Please enter a number [1]: █
```

A screen showing both the installation log location and some instructions appears:

Welcome to Oracle Solaris

Thanks for choosing to install Oracle Solaris! This installer enables you to install the Oracle Solaris Operating System (OS) on SPARC or x86 systems.

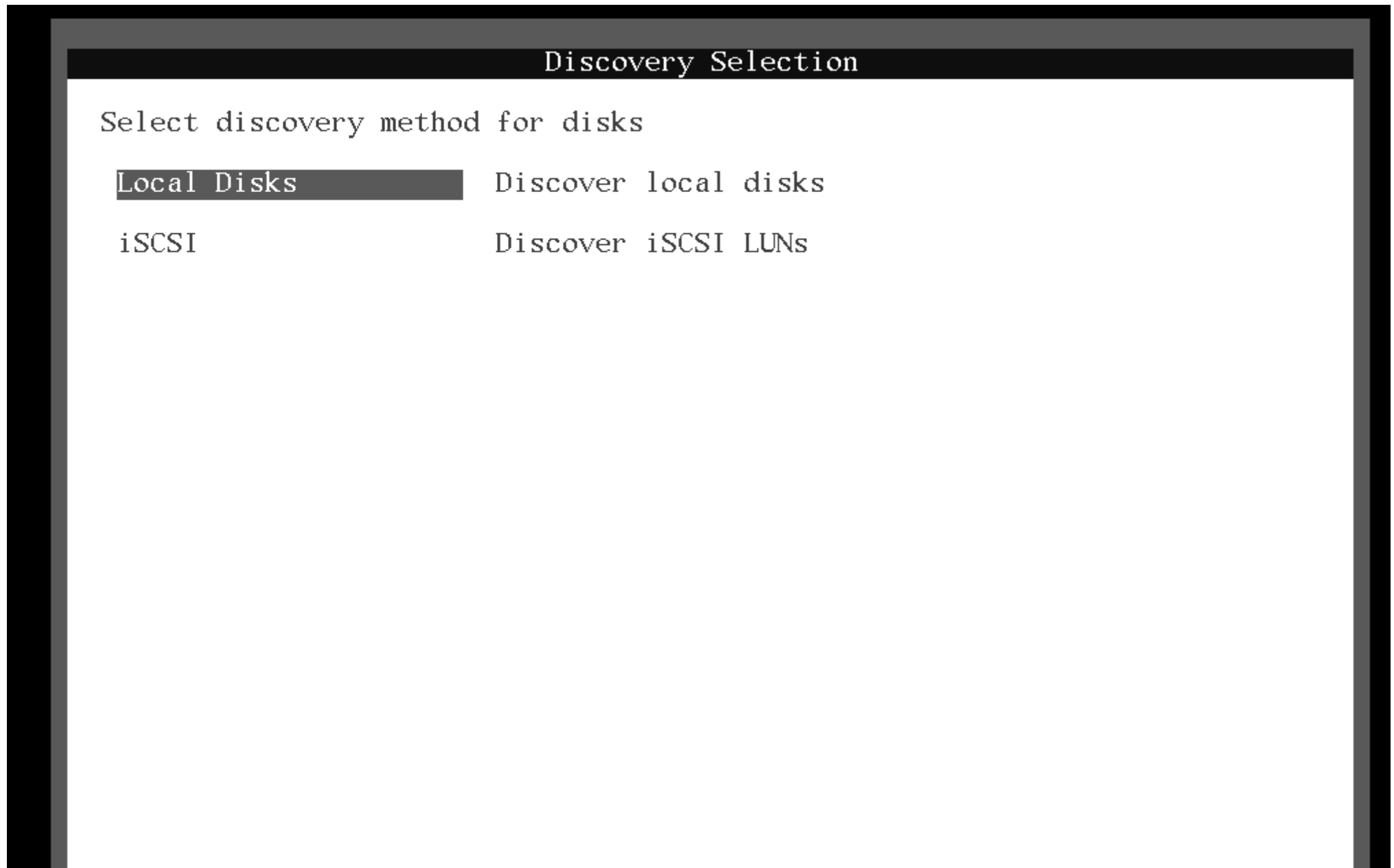
The installation log will be at `/system/volatile/install_log`.

How to navigate through this installer:

- Use the function keys listed at the bottom of each screen to move from screen to screen and to perform other operations.
- Use the up/down arrow keys to change the selection or to move between input fields.
- If your keyboard does not have function keys, or they do not respond, press ESC; the legend at the bottom of the screen will change to show the ESC keys for navigation and other functions.

Move to the following screen using the `F2` key. If the function key does not work or is absent, hit `Esc` then `Esc 2` at the same time. This screen asks

you to choose either Local Disks or iSCSI LUN discovery. For the purpose of this installation, you should choose **Local Disks**:



Move to the next screen using the **F2** key or the **Esc** **2** keys as shown at the bottom of the current screen:

iSCSI

Discover iSCSI LUNs

F2_Continue F3_Back F6_Help F9_Quit

The system should now have discovered the local disk to install to. Since in the case of this example, we are installing to a new media, no GPT labeled disk has been found. The installation program suggests a partition table. Note the name of the device is of the following format **c?t?d?**:

Letter	Description	Starting Value
c	Disk controller device number	0
t	Controller's target number	0
d	Disk number on the controller	0

Make sure the disk is highlighted and then hit :

Disks

Where should Oracle Solaris be installed?

Minimum size: 2.9GB Recommended minimum: 4.9GB

Type	Size(GB)	Boot	Device
------	----------	------	--------

sata	20.0	+	c7t0d0	VBOX
------	------	---	--------	------

A GPT labeled disk was not found. The following is proposed.

Partition	Type	Size(GB)
BIOS Boot	Part	0.2
Solaris		19.7
Unused		0.0
Unused		0.0

Partition	Type	Size(GB)
Unused		0.0
Unused		0.0
Unused		0.0
Unused		0.0
1 more partitions		

At this stage you can choose to either install to the entire disk (the default choice) or install to a partition in the case of a multiple boot environment.

Highlight the **Use the entire disk** option and hit the **F2** key or the the **Esc** **2** keys:

GPT Partitions: 20.0GB sata Boot

Oracle Solaris can be installed on the whole disk or a GPT partition on the disk.

The following GPT partitions were found on the disk.

Partition Type	Size(GB)	Partition Type	Size(GB)
BIOS Boot Part	0.2	Unused	0.0
Solaris	19.7	Unused	0.0
Unused	0.0	Unused	0.0
Unused	0.0	Unused	0.0
		1 more partitions	

Use the entire disk
Use a GPT partition of the disk

You now need to specify a name for the system. Use the same one as in the example - **fenestros.solaris.loc**:

Network

Enter a name for this computer that identifies it on the network. It must be at least two characters. It can contain letters, numbers, and minus signs (-).

Computer Name: **solaris.fenestros.loc**

Select how the wired ethernet network connection is configured.

- | | |
|---------------|---|
| Automatically | Automatically configure the connection |
| Manually | Enter the information on the following screen |
| None | Do not configure the network at this time |

Highlight the **Automatically** option in order to automatically configure the network connection via **DHCP** and hit the **F2** key or the the **Esc** **2** keys:

Network

Enter a name for this computer that identifies it on the network. It must be at least two characters. It can contain letters, numbers, and minus signs (-).

Computer Name: solaris.fenestros.loc

Select how the wired ethernet network connection is configured.

- Automatically** Automatically configure the connection
- Manually Enter the information on the following screen
- None Do not configure the network at this time

Select the region that contains your time zone and hit the **F2** key or the the **Esc** **2** keys:

Time Zone: Regions

Select the region that contains your time zone.

Regions

UTC/GMT
Africa
Americas
Antarctica
Arctic Ocean
Asia
Atlantic Ocean
Australia
Europe
Indian Ocean
Pacific Ocean

Select the location that contains your time zone and hit the **F2** key or the the **Esc** **2** keys:

Time Zone: Locations

Select the location that contains your time zone.

Locations

- Aaland Islands
- | Albania
- | Andorra
- | Austria
- | Belarus
- | Belgium
- | Bosnia & Herzegovina
- | Britain (UK)
- | Bulgaria
- | Croatia
- | Czech Republic
- | Denmark
- | Estonia
- | Europe - Central
- | Europe - Eastern
- | Europe - Western
- | Finland
- | **France**
- | Germany
- | Gibraltar
- | Greece
- |

Select your time zone and hit the **F2** key or the the **Esc** **2** keys:




Check the date and time and correct if necessary then hit the **F2** key or the the **Esc** **2** keys:

Date and Time

Edit the date and time as necessary.
The time is in 24 hour format.

Year: 2012 (YYYY)
Month: 11 (1-12)
Day: 20 (1-30)
Hour: 20 (0-23)
Minute: 04 (0-59)

You now need to specify the **root** (Administrator) password and the name and password of the first user on the system. Several points need to be considered here :

- The default password-hashing program in Solaris 11 is  **SHA-256**. This means that the passwords are no longer limited to 8 characters as in the case of Solaris 10,
- The default password security policy requires that passwords contain at least one digit **and** one special character,
- Under Solaris 11, the **root** user is a **role** indicating that you cannot log in directly with the **root** account,
- The first user created on the system is assigned the **root** role so that he/she can become **root** using the **su** command.

For the purposes of this training course, specify **fenestr0\$** as the password for **root** and **trainee/fenestr0\$** as the username and password of the user to be created.

When installing a machine for production purposes, do **not** use the same password for the root and user account!

When you have finished, hit the **F2** key or the the **Esc** **2** keys:

Users

Define a root password for the system and user account for yourself.

System Root Password

Root password: *****

Confirm password: *****

Create a user account

Your real name: trainee

Username: trainee

User password: *****

Confirm password: *****

At this stage you should enter the email address and password of your Oracle Support Account.

Oracle's licensing policy for Solaris 11 does **not** permit you to put a Solaris 11 system into production without an Oracle Support Account.

Since the licensing policy does allow you to evaluate Solaris 11 for an indefinite period, enter your email address but leave the password field empty. When finished hit the F2 key or the the Esc 2 keys:

Support - Registration

Provide your email address to be informed of security issues,
install the product and initiate configuration manager.

Please see <http://www.oracle.com/goto/solarisautoreg> for details.

Email: **hugh.norris@fenestros.com** [REDACTED]
Easier for you if you use your My Oracle Support email
address/username.

Please enter your password if you wish to receive security
updates via My Oracle Support.

My Oracle Support password:

If your network uses a proxy, enter the details here. If not choose the **No proxy** option and hit the **F2** key or the the **Esc** **2** keys:

Support - Network Configuration

To improve products and services, Oracle Solaris relays configuration data to the Oracle support organization.

Select an internet access method for OCM and ASR.

No proxy Use system Internet connection parameters

Proxy Enter proxy information on the next screen

Aggregation Hubs Enter hubs information on the next screen

Review the Installation Summary and modify it if necessary. If not, hit the **F2** key or the the **Esc** **2** keys:

Installation Summary

Review the settings below before installing. Go back (F3) to make changes.

Software: Oracle Solaris 11.1 X86

Disk: 20.0GB sata

Partition: 19.7GB Solaris

Time Zone: Europe/Paris

Language: *The following can be changed when logging in.

Default language: English

Keyboard layout: *The following can be changed when logging in.

Default keyboard layout: French

Terminal type: sun-color

Users:

Username: trainee

Network:

Computer name: solaris.fenestros.loc

Network Configuration: Automatic

Support configuration:

..

The system will now be installed:



At the end on the installation, the screen shows you where you will find the installation log after rebooting. Hit the **F8** key to reboot:

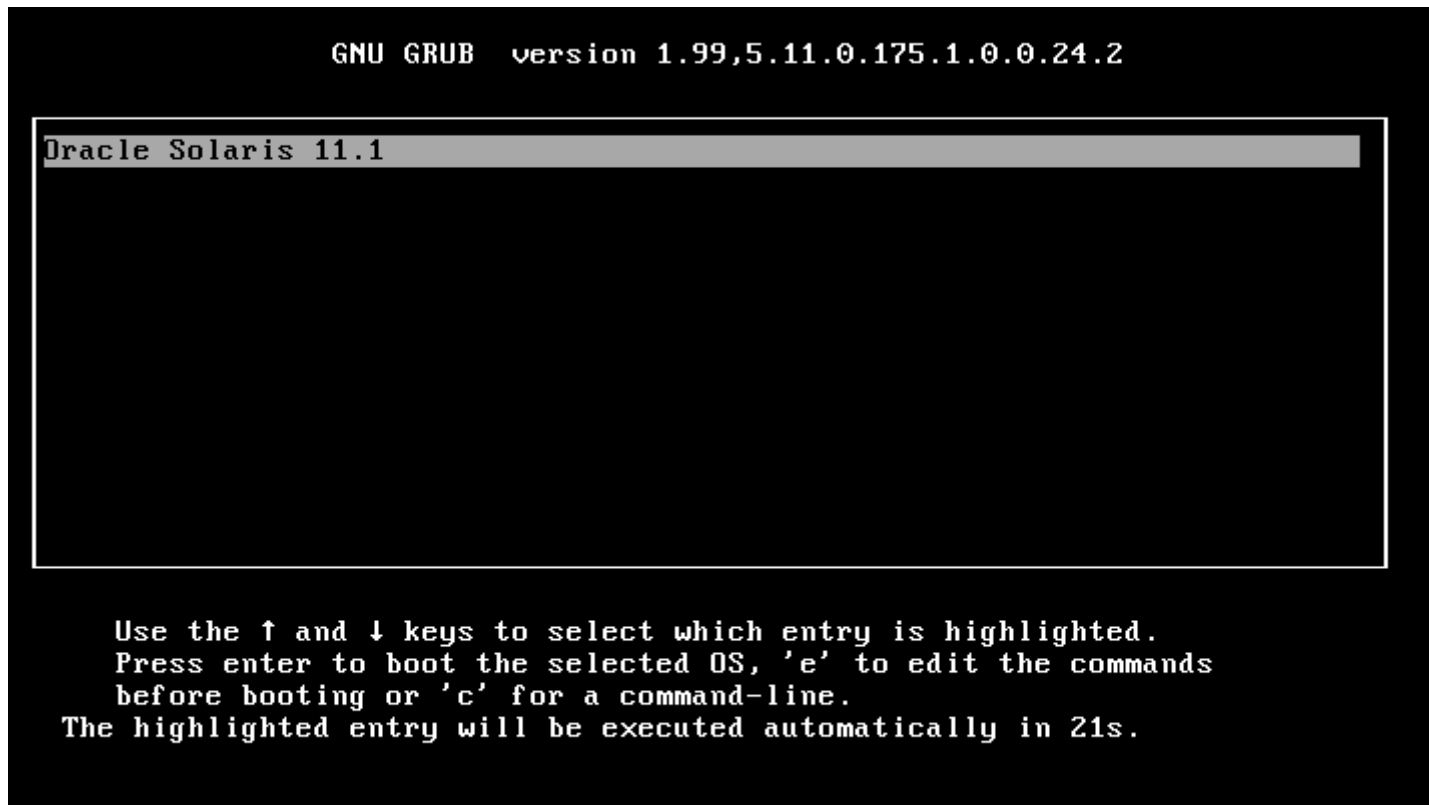
Installation Complete

The installation of Oracle Solaris has completed successfully.

Reboot to start the newly installed software or Quit if you wish to perform additional tasks before rebooting.

The installation log is available at `/system/volatile/install_log`. After reboot it can be found at `/var/log/install/install_log`.

Your newly installed Solaris 11 system will reboot:



Once booted, log into the system from the command line using the trainee/fenestr0\$ account. In order to install the gnome desktop environment, use the following command :

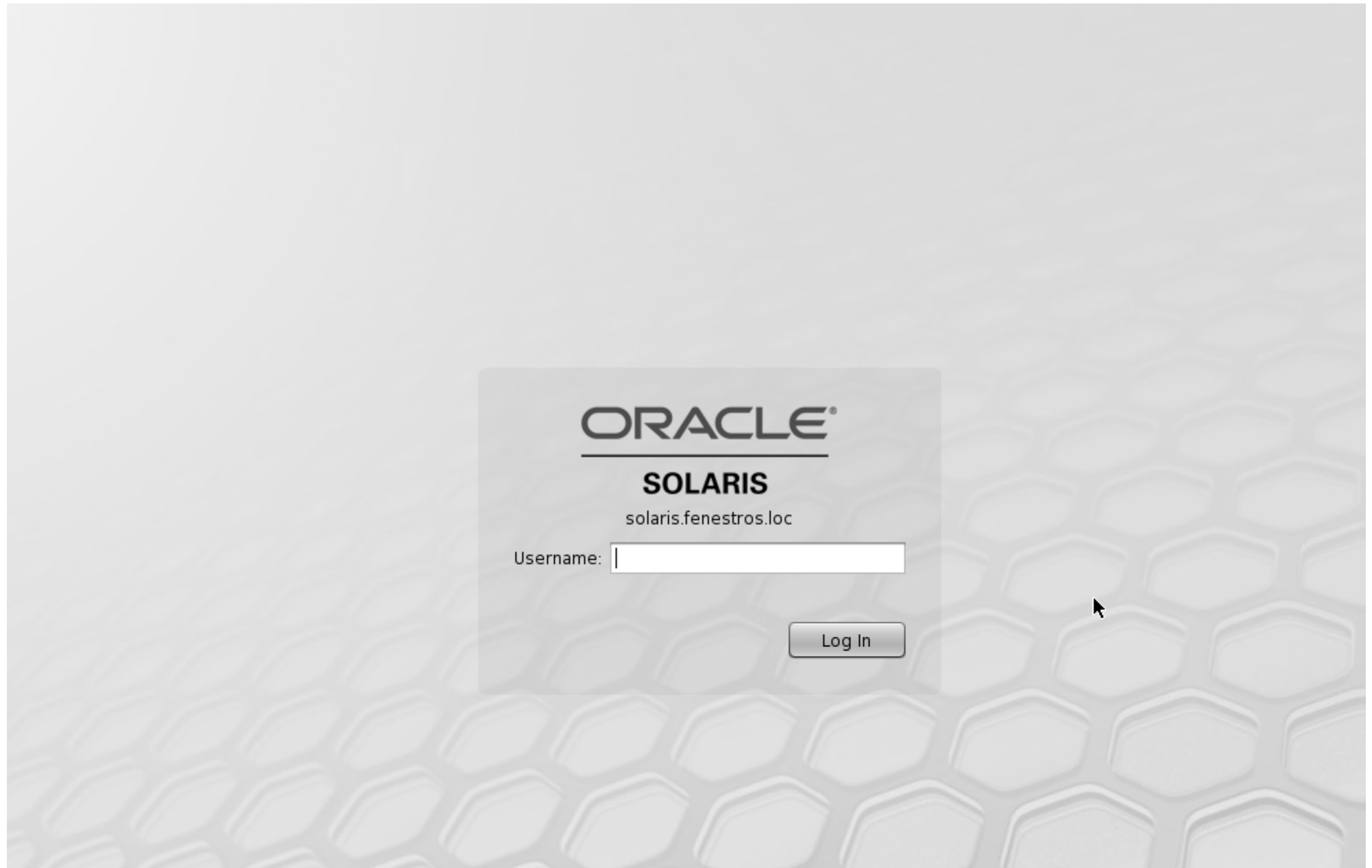
```
trainee@solaris:~$ sudo pkg install slim_install
Password: fenestr0$
```

The password will **not** be shown. It is so in the example above so that you do not forget what it is!

Once all the packages are installed, use the following command to start the graphical log in service at boot:

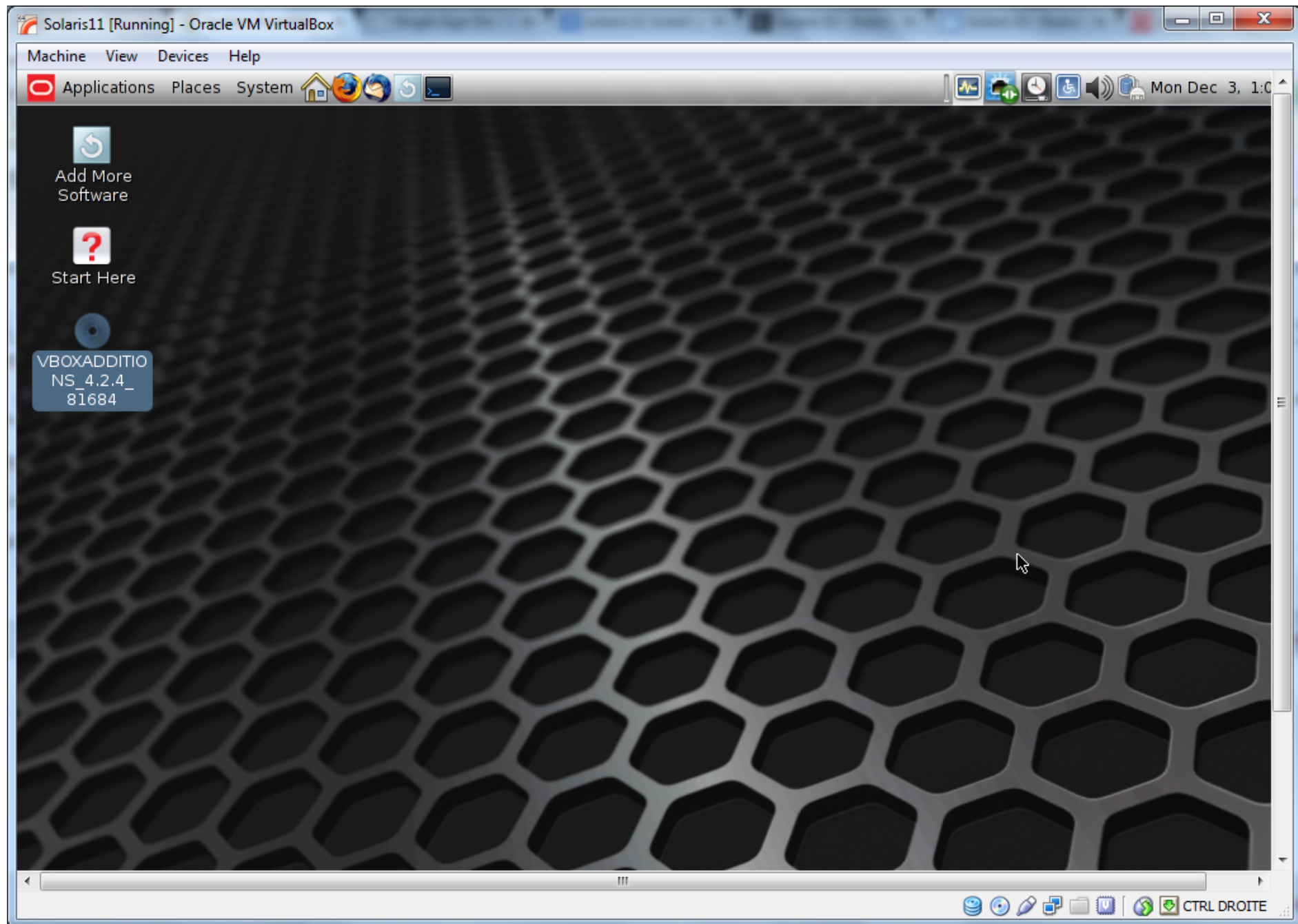
```
trainee@solaris:~$ sudo svcadm enable gdm
```

Re-boot the machine and log in graphically :

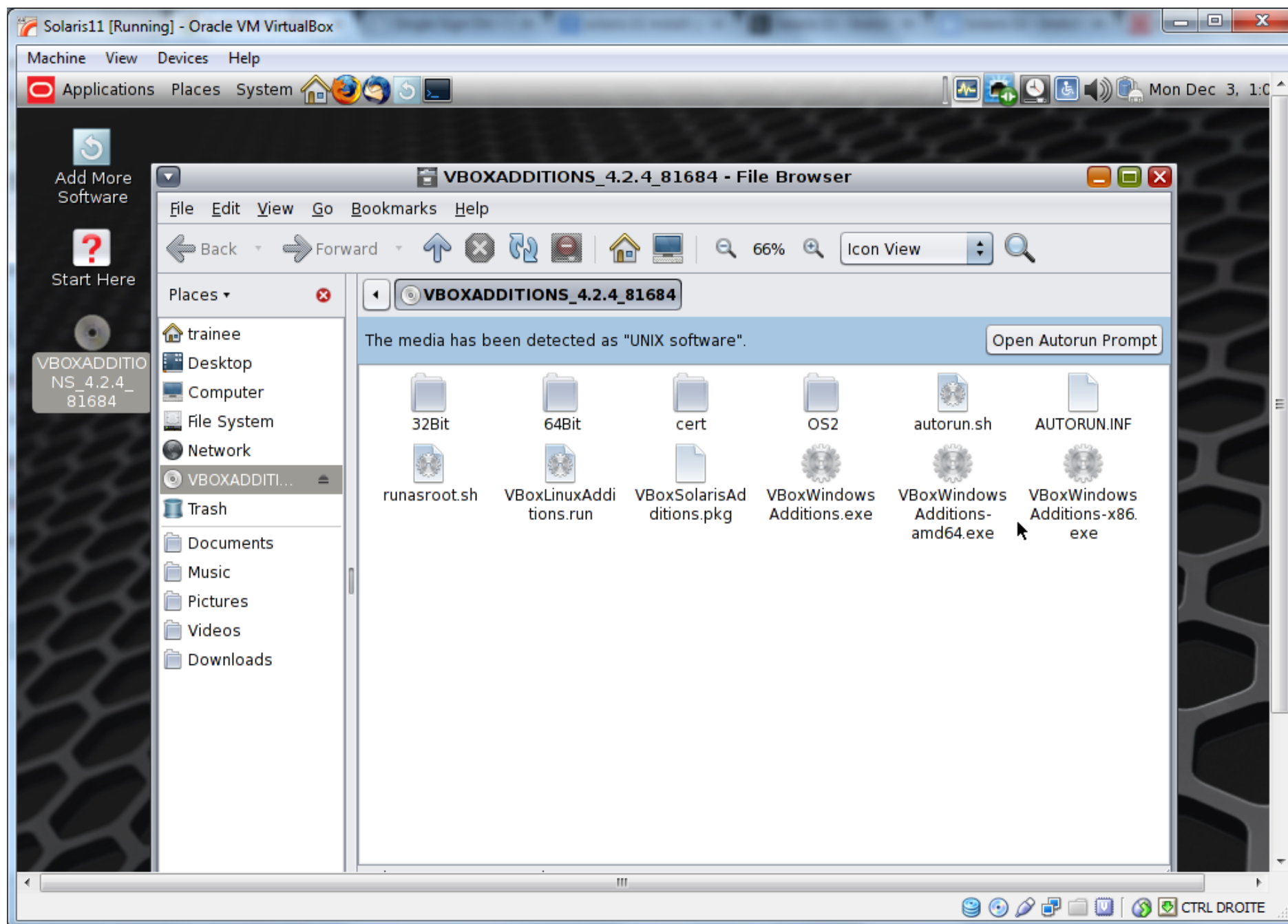


Once logged back in, you need to install the VirtualBox Guest Additions. To do so click on the VirtualBox **Devices** menu. Select the **Install Guest**

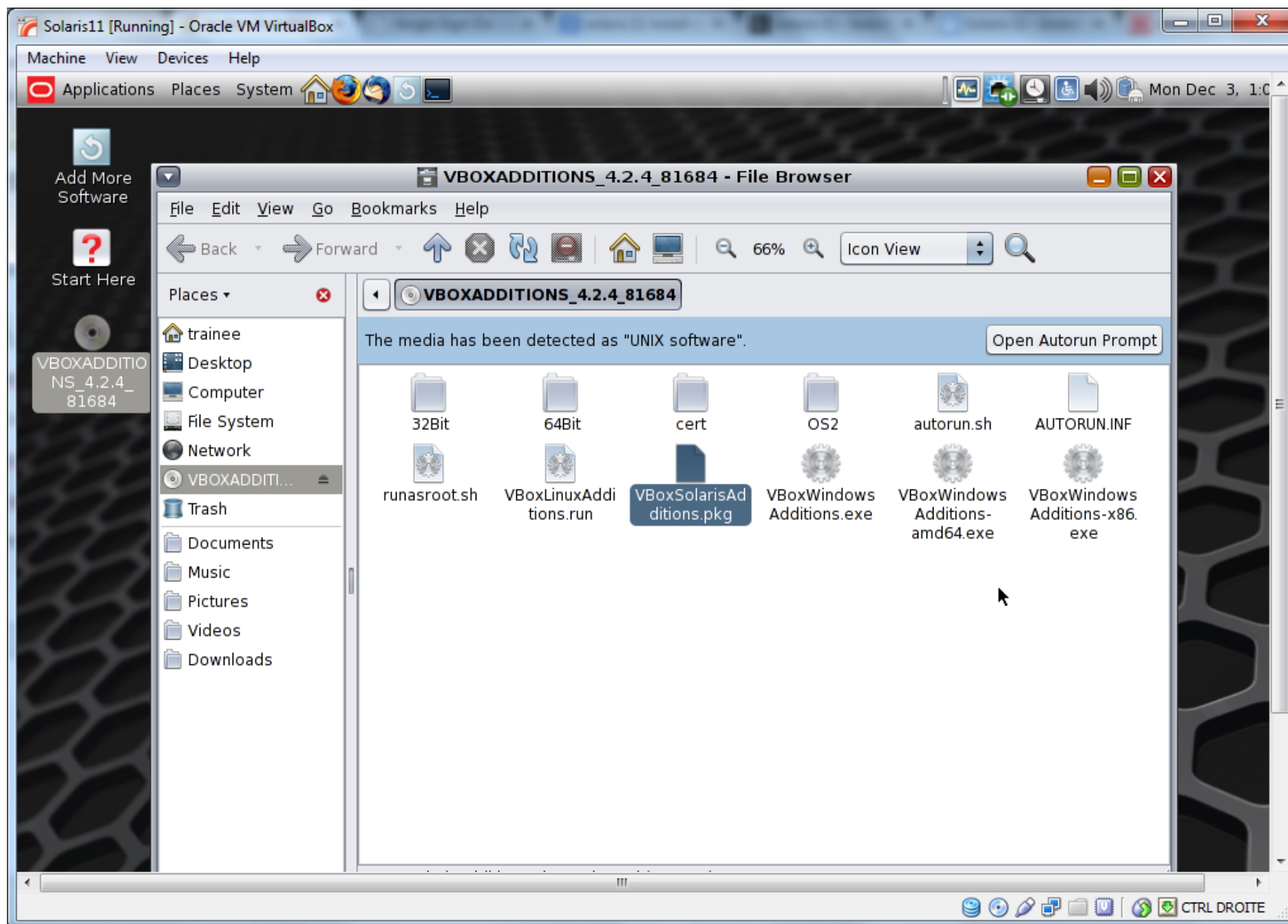
Additions menu item. VirtualBox will mount the VirtualBox Guest Additions ISO and an icon will appear on your desktop:



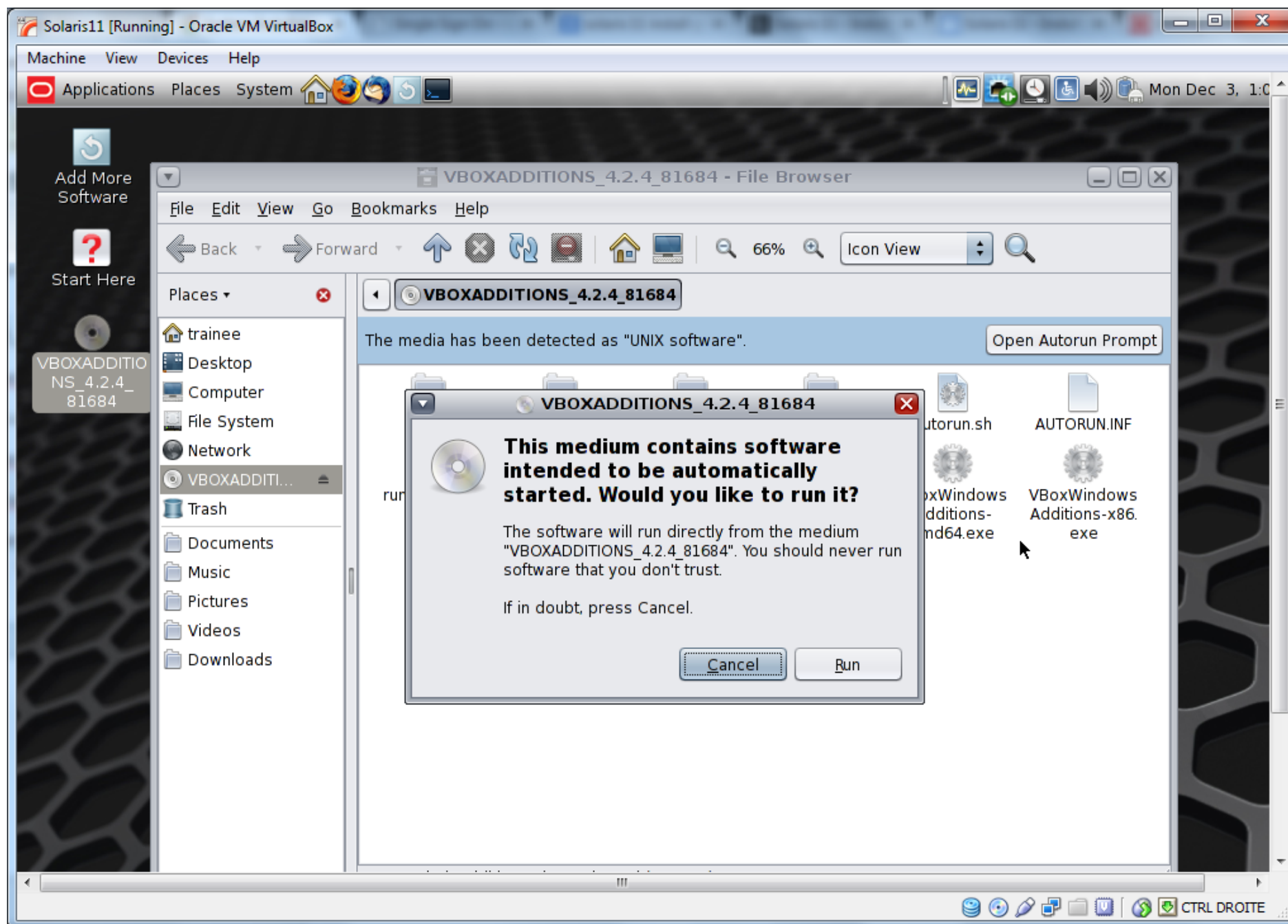
Double click on the icon to open the window containing it's contents:



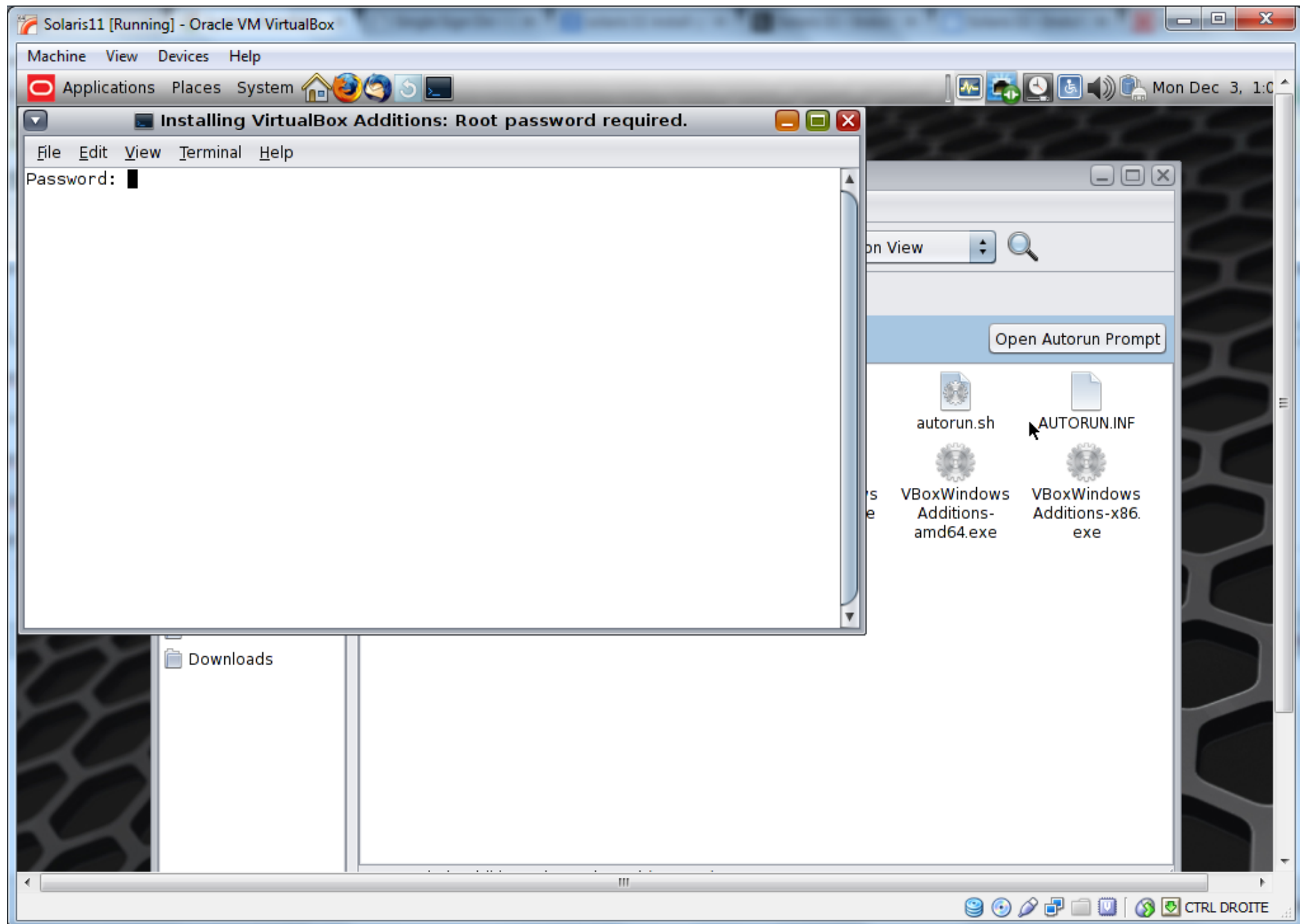
Highlight the **VBoxSolarisAdditions.pkg** package and click on the **Open Autorun Prompt** button:



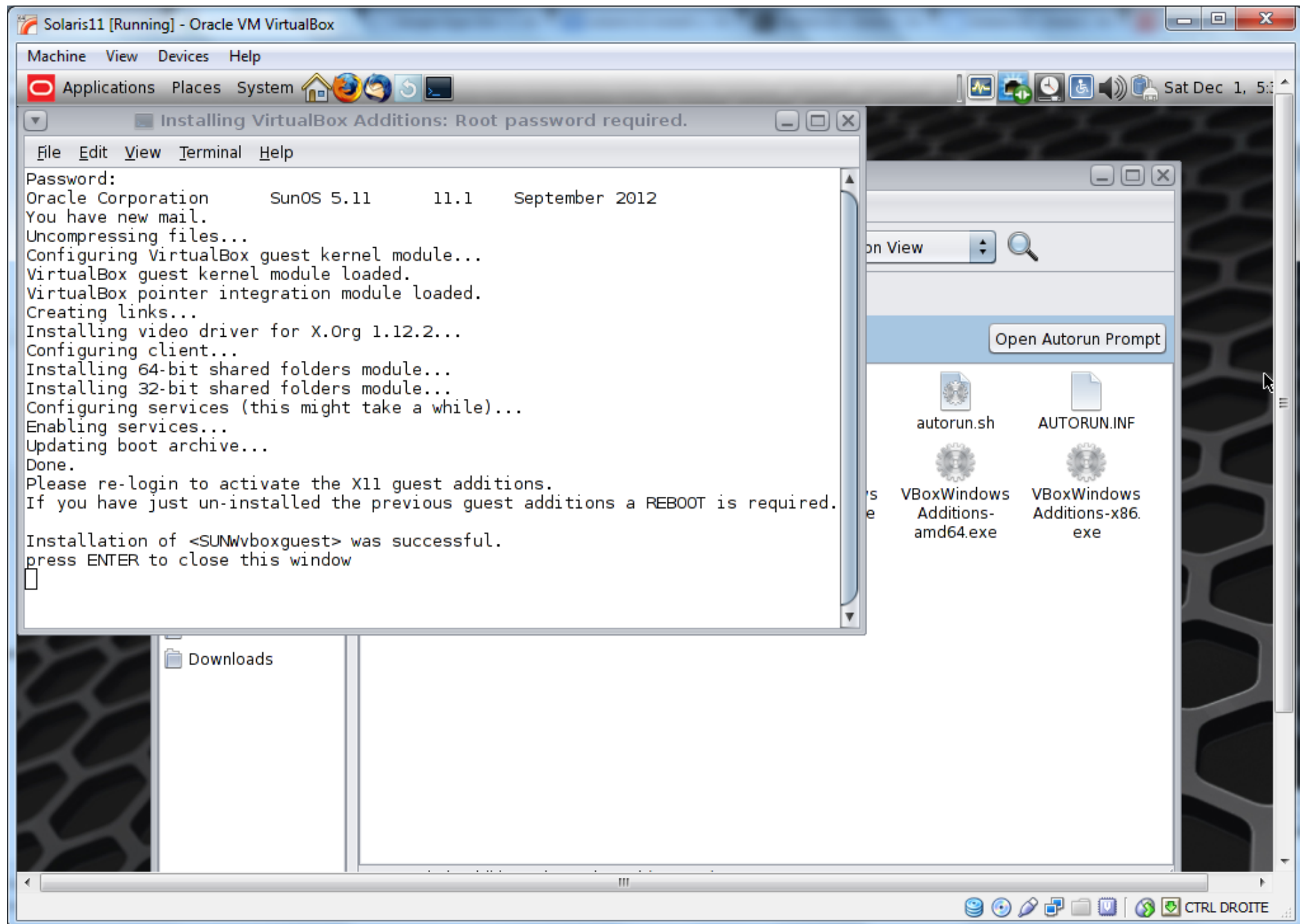
In the pop-up box, click on the **Run** button:



In the terminal that pops up asking for a password, type **fenestr0\$**:



Wait until the installation has completed and then hit to close the terminal:

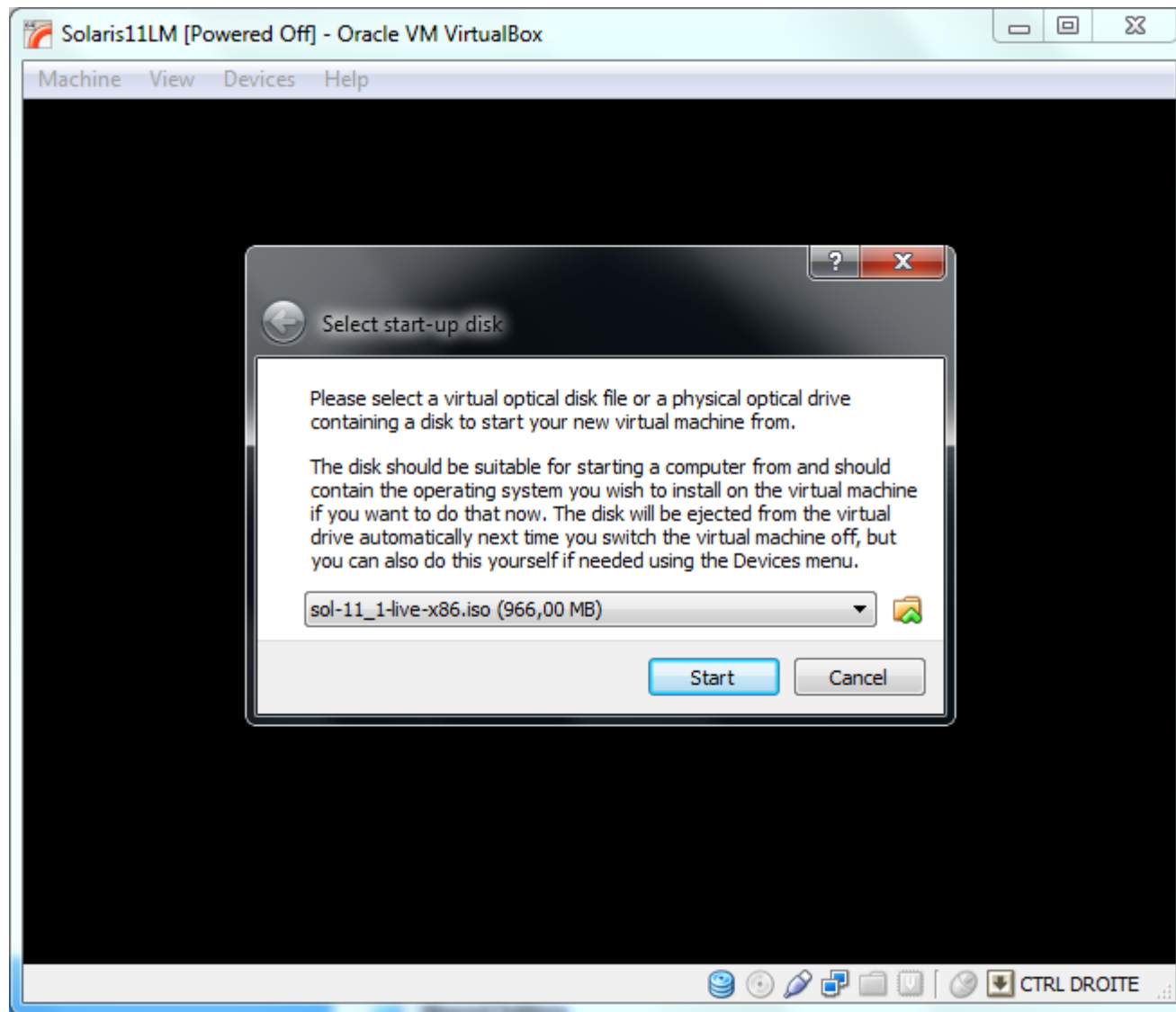


Eject the ISO image and reboot the system.

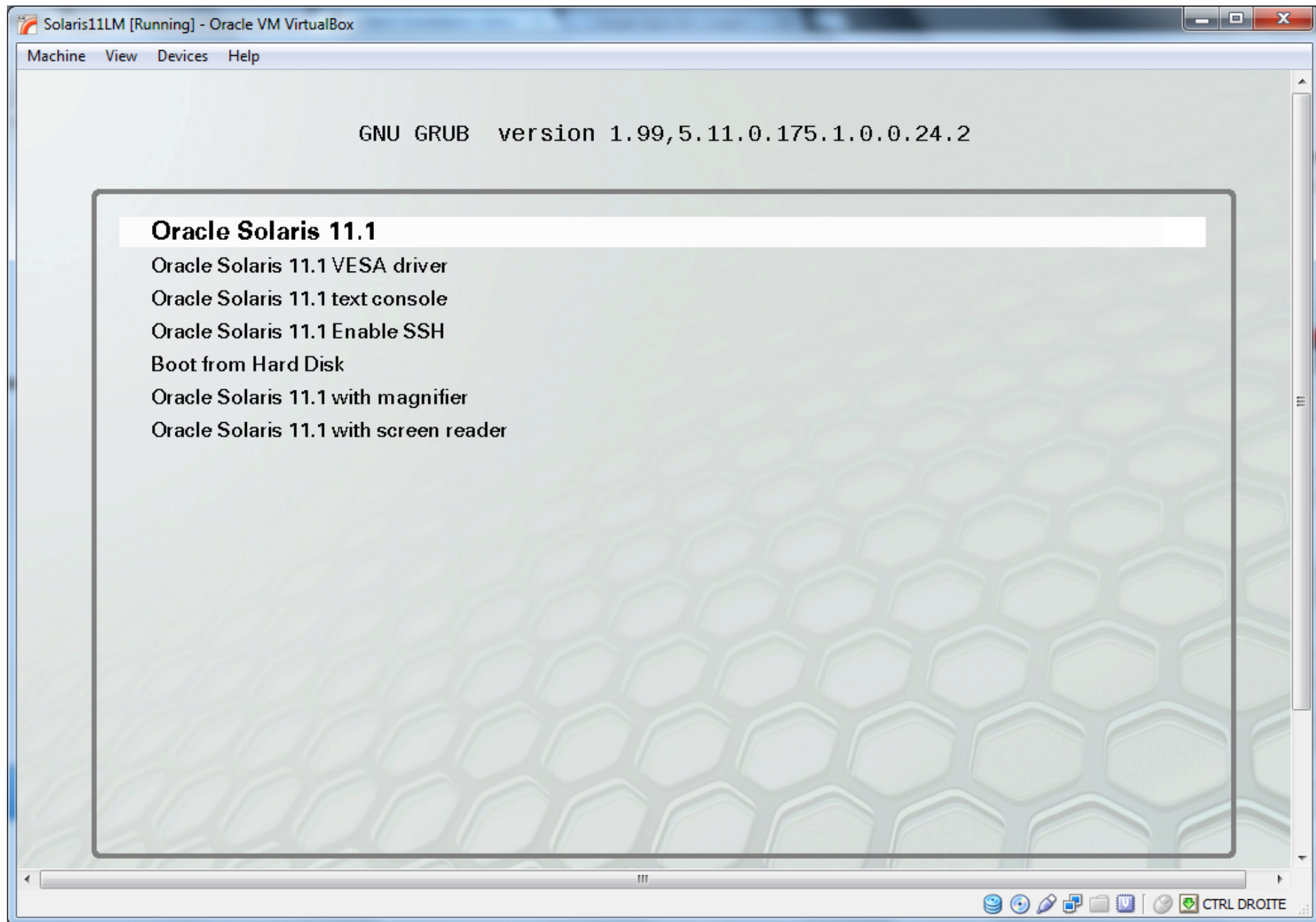
LAB #2 - Live Install in VirtualBox

Create a new virtual machine in VirtualBox with a 20GB **vmdk** hard disk and 2048MB of RAM.

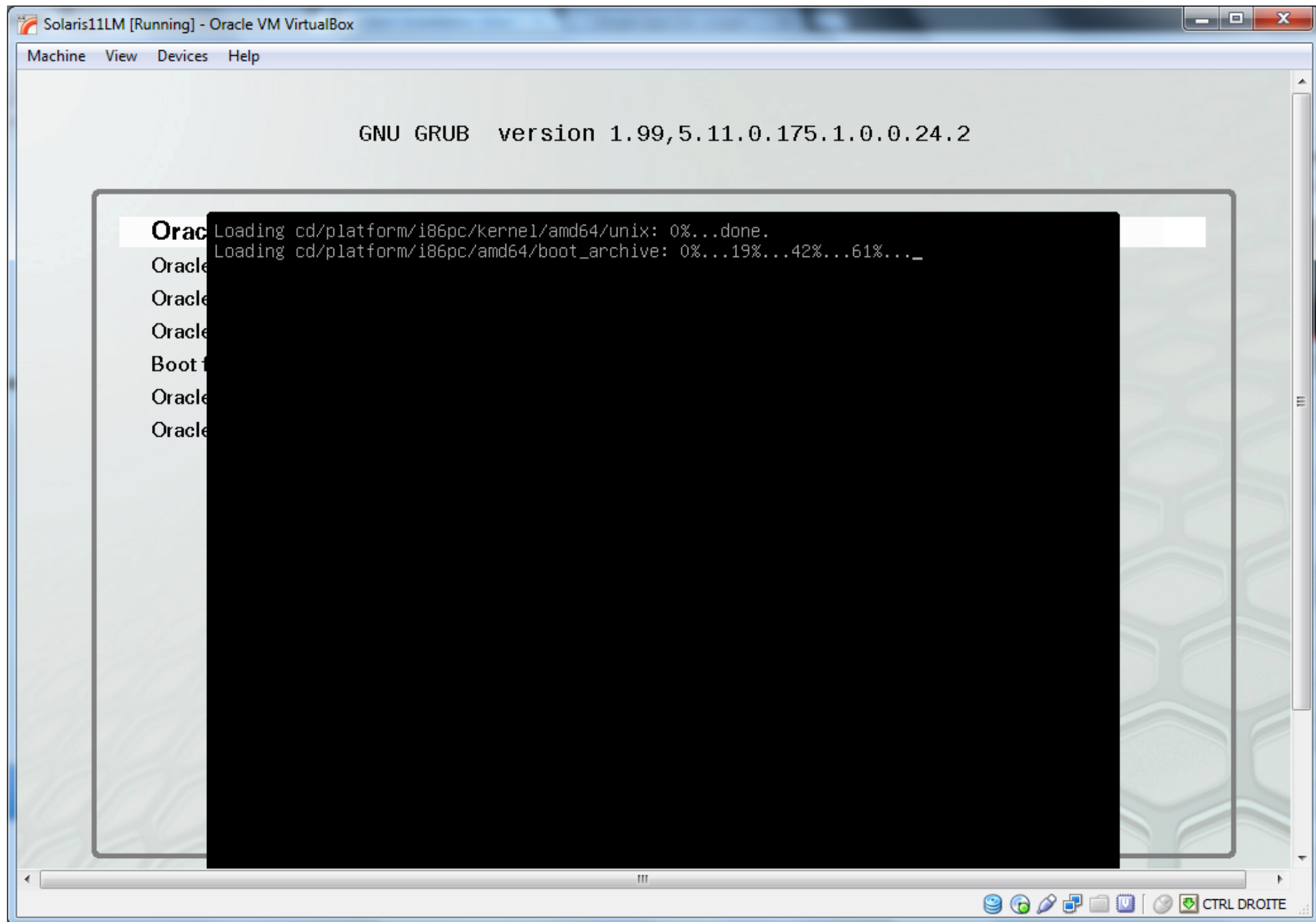
Start the new machine and tell it to boot the Live Media ISO:



From the grub boot menu, choose the **Oracle Solaris 11.1** item and hit ↵ Enter:



The Live system will boot:



The system now prompts you to choose a keyboard layout:

```
SunOS Release 5.11 Version 11.1 64-bit
Copyright (c) 1983, 2012, Oracle and/or its affiliates. All rights reserved.
Remounting root read/write
Probing for device nodes ...
Preparing image for use
Done mounting image
USB keyboard
 1. Arabic
 2. Belgian
 3. Brazilian
 4. Canadian-Bilingual
 5. Canadian-French
 6. Danish
 7. Dutch
 8. Dvorak
 9. Finnish
10. French
11. German
12. Italian
13. Japanese-type6
14. Japanese
15. Korean
16. Latin-American
17. Norwegian
18. Portuguese
19. Russian
20. Spanish
21. Swedish
22. Swiss-French
23. Swiss-German
24. Traditional-Chinese
25. TurkishQ
26. UK-English
27. US-English
To select the keyboard layout, enter a number [default 27]:
```

Followed by the choice of the installation language:

USB keyboard

- | | |
|-----------------------|-------------------------|
| 1. Arabic | 15. Korean |
| 2. Belgian | 16. Latin-American |
| 3. Brazilian | 17. Norwegian |
| 4. Canadian-Bilingual | 18. Portuguese |
| 5. Canadian-French | 19. Russian |
| 6. Danish | 20. Spanish |
| 7. Dutch | 21. Swedish |
| 8. Dvorak | 22. Swiss-French |
| 9. Finnish | 23. Swiss-German |
| 10. French | 24. Traditional-Chinese |
| 11. German | 25. TurkishQ |
| 12. Italian | 26. UK-English |
| 13. Japanese-type6 | 27. US-English |
| 14. Japanese | |

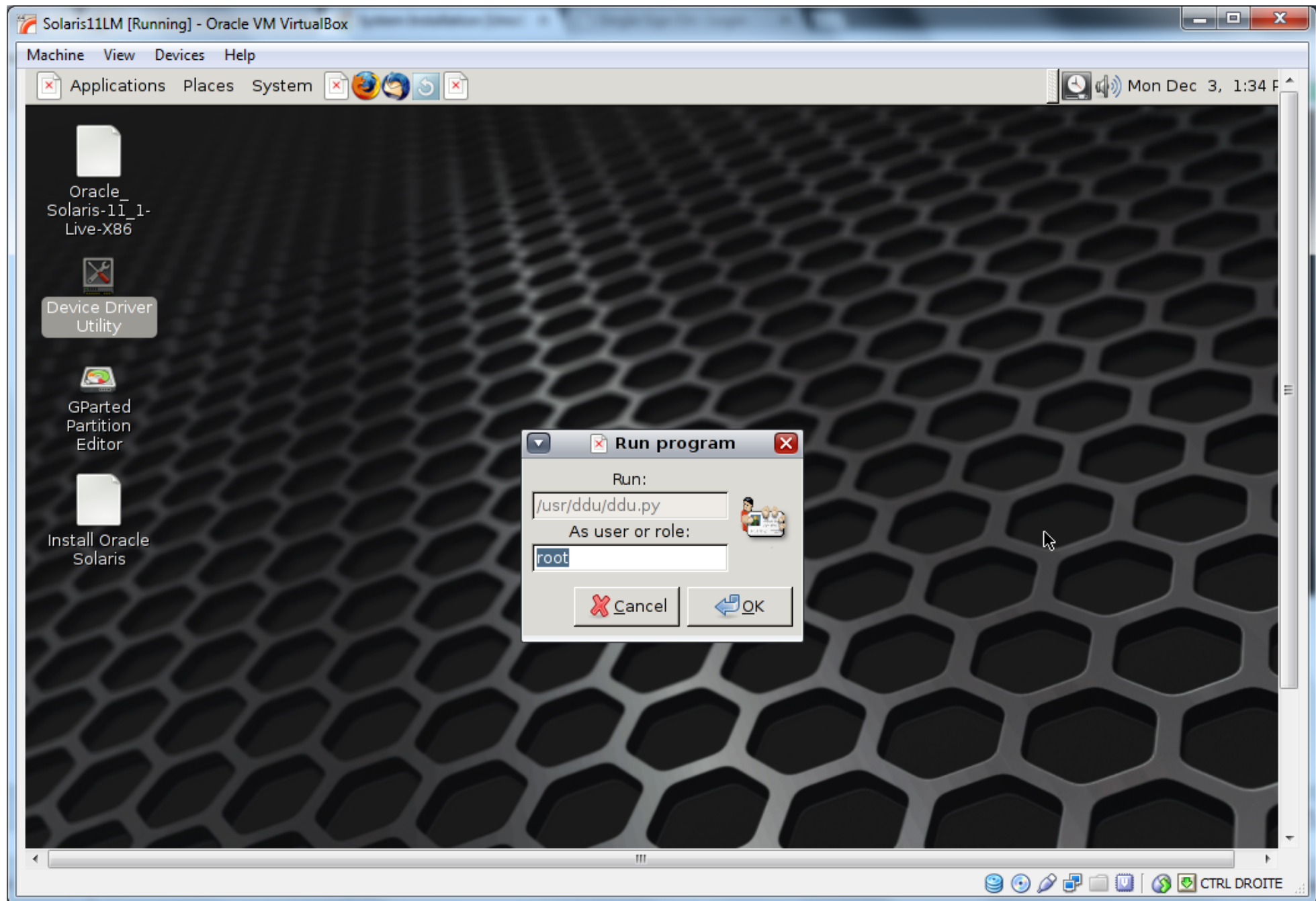
To select the keyboard layout, enter a number [default 27]:10

1. Chinese - Simplified
2. Chinese - Traditional
3. English
4. French
5. German
6. Italian
7. Japanese
8. Korean
9. Portuguese - Brazil
10. Spanish

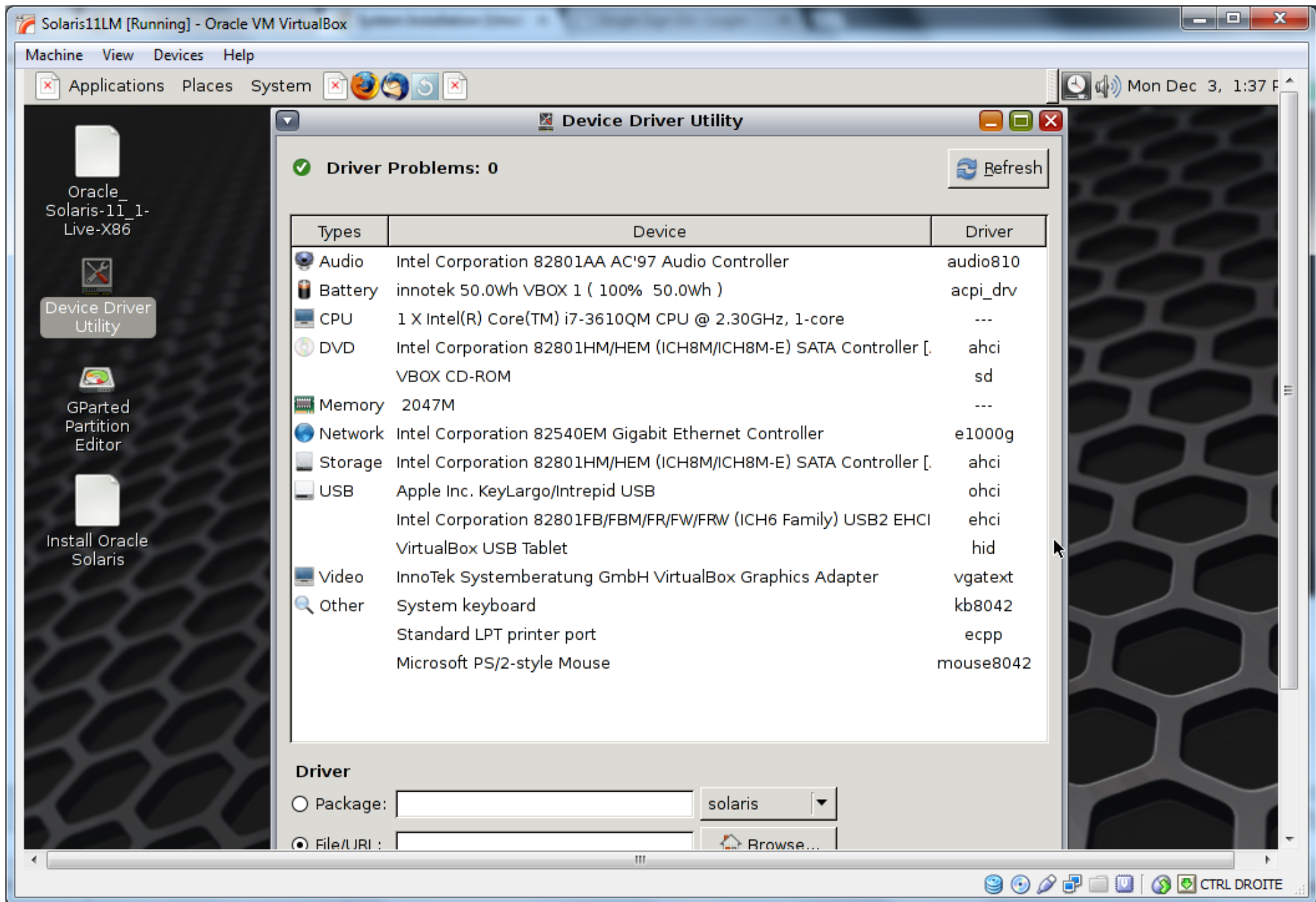
To select the language you wish to use, enter a number [default is 3]:

When the system asks you to log in at the command line, do **NOTHING**. Wait until the graphical interface launches.

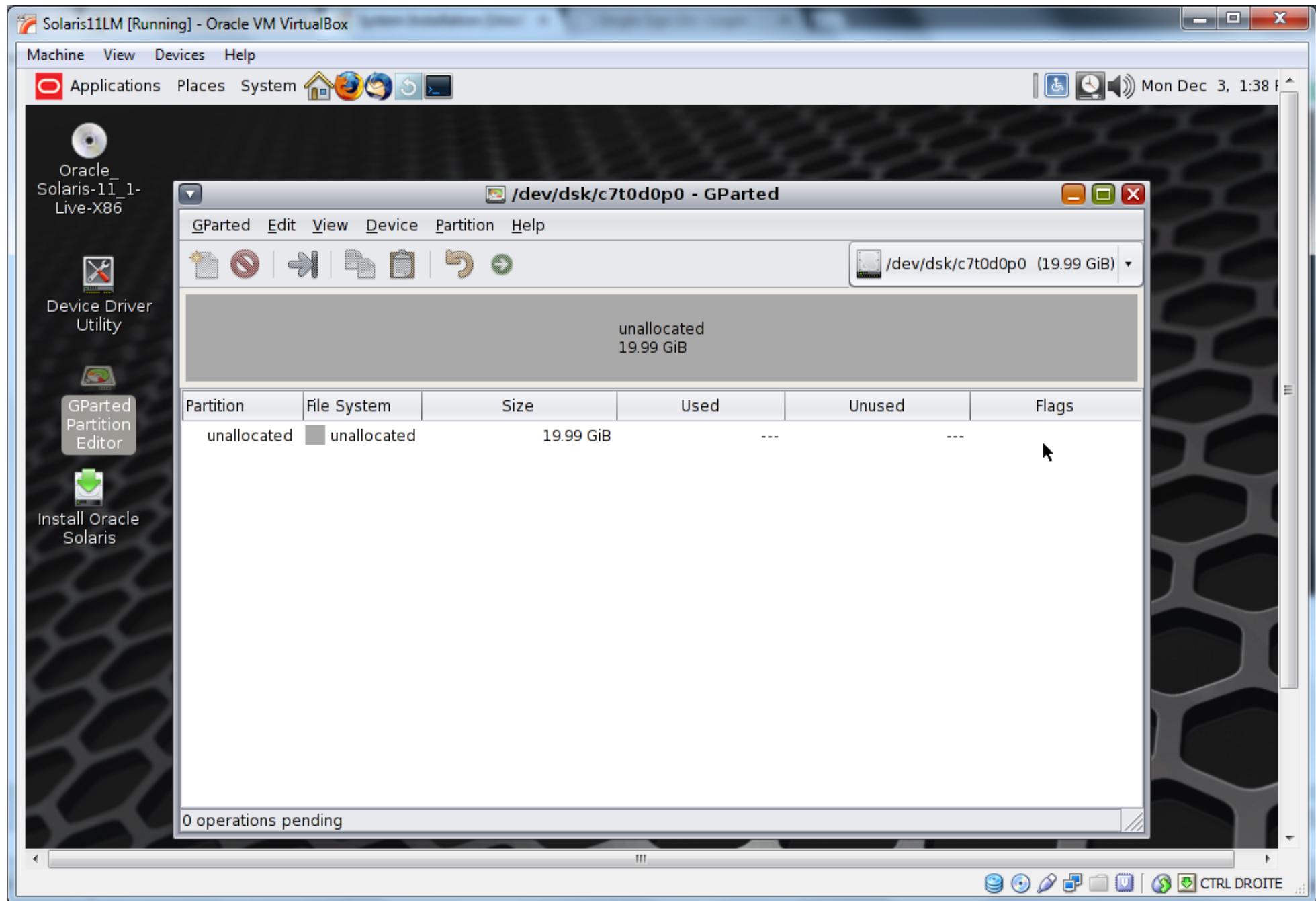
Once the graphical interface has launched, double click on the **Device Driver Utility** icon and click on the **OK** button to run the program as **root**. When prompted enter **solaris** as the **root** password:



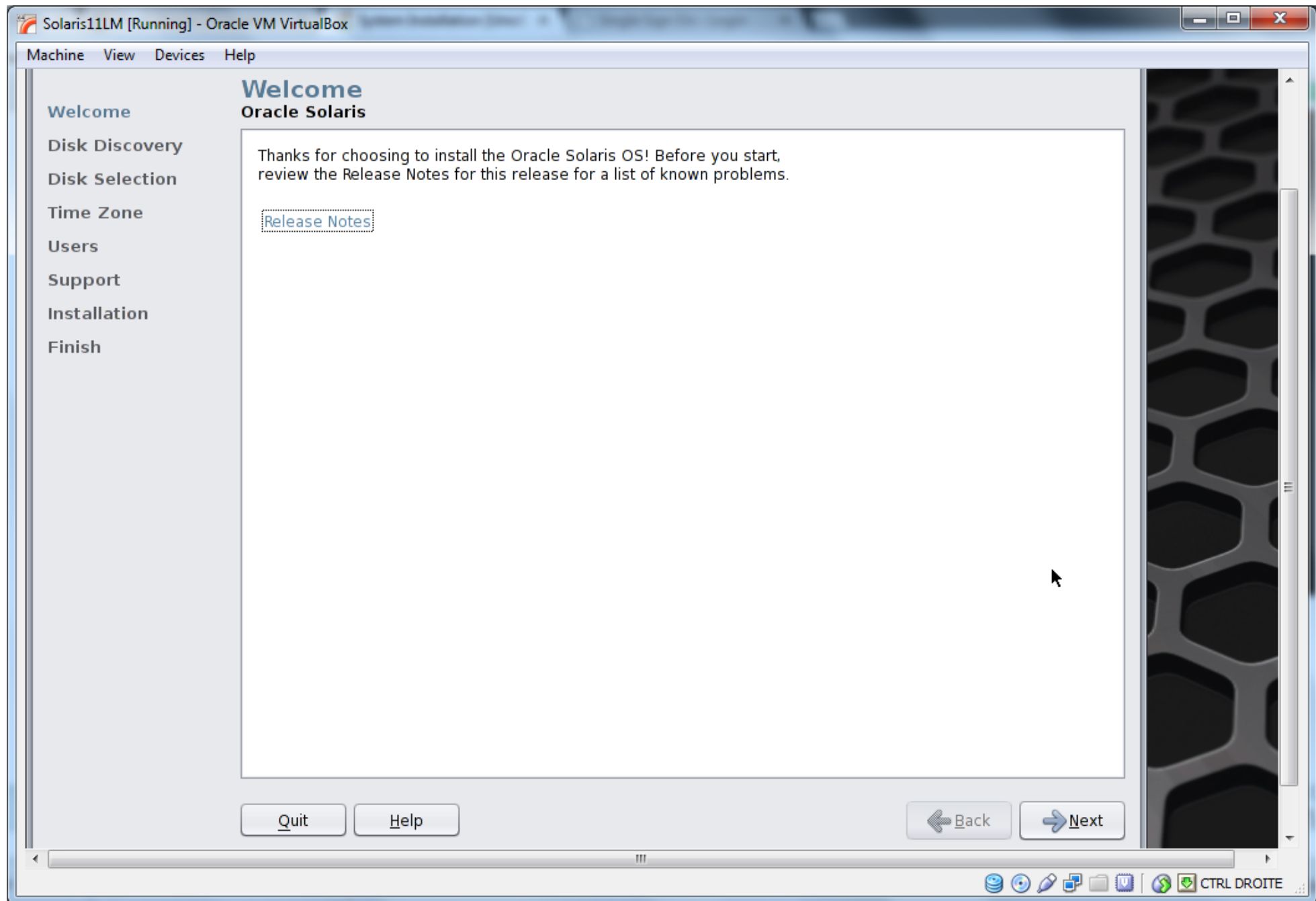
After a little while, the Device Driver Utility will show you any eventual driver problems:



Close the Device Driver Utility window and double-click on the **GParted Partition Editor** icon. Using this application you can make space on a disk that already contains a Linux system in order to install Solaris 11:



Close the GParted window and double-click on the **Install Oracle Solaris** icon:



Using what you have learnt in the **Text Install** section of this lesson, install Solaris 11 using the **Live Media**. Once installed, log in, open a terminal and try to switch to the root role. Note that the root password has expired. Set the new root password to **wind0w\$**. Finally install the VirtualBox Additions.

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