# 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:

```
  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                    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]:
```

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 ↵ Enter :

```
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**:

```
                         Discovery Selection

  Select discovery method for disks

     Local Disks          Discover local disks

     iSCSI                Discover iSCSI LUNs
```

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 ↵ Enter:

```
                                    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)          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
```

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:

```
                            Time Zone

   Select your time zone.

      Time Zones
      -------------------------------------------
      Europe/Paris
```

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
              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

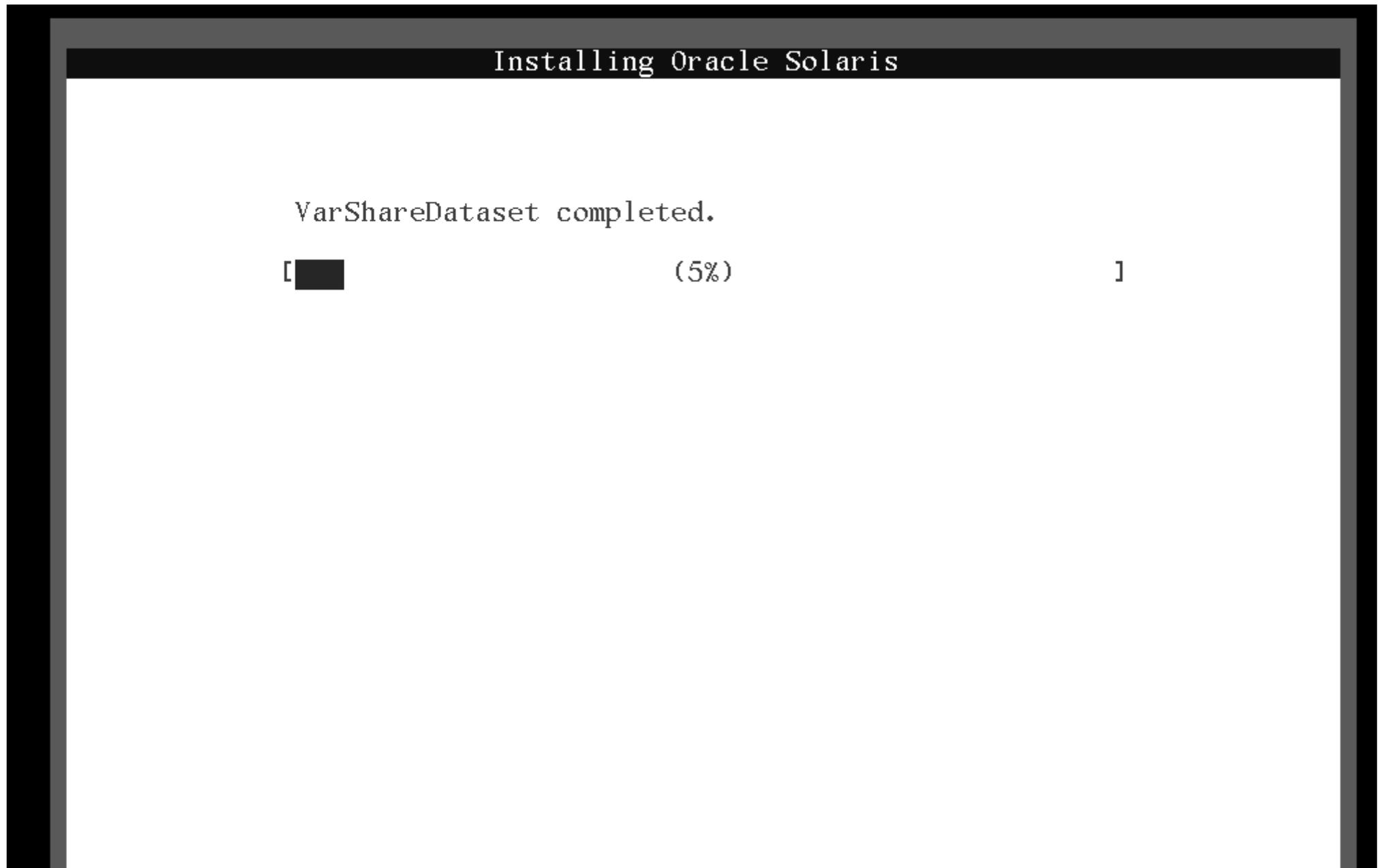Terminal type: sun-color

Users:
Username: trainee

Network:
Computer name: solaris.fenestros.loc
Network Configuration: Automatic

Support configuration:

The system will now be installed:

_____

## Installing Oracle Solaris

VarShareDataset completed.

[███          (5%)          ]

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 environement, use the following command :

```
trainee@solaris:~$ sudo pkg install slim_install
Password: fenestr0$
```
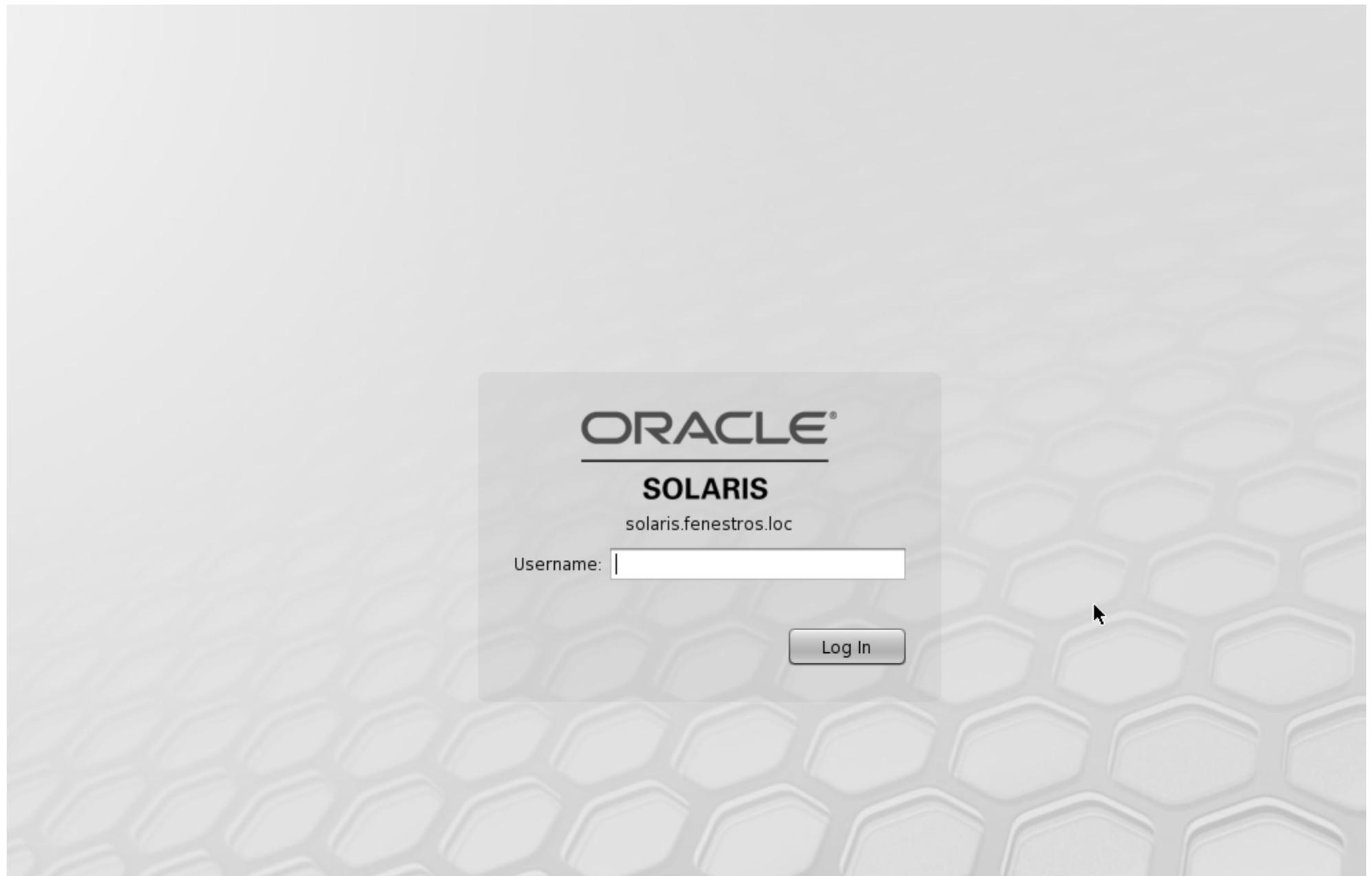
> ⚠️ The password will **not** be shown. It is so in the example above so that you do not forget what it is!

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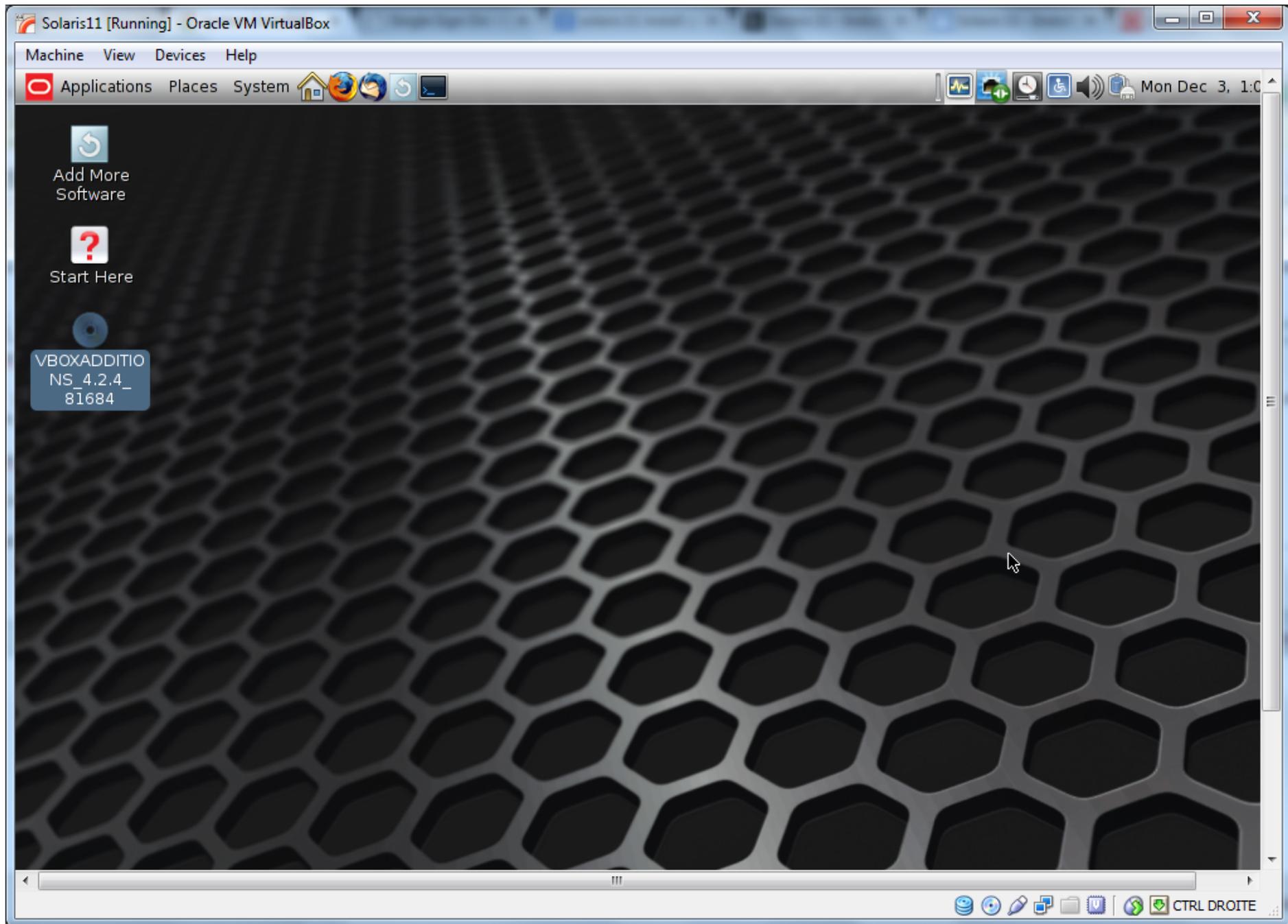
_____

```
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**
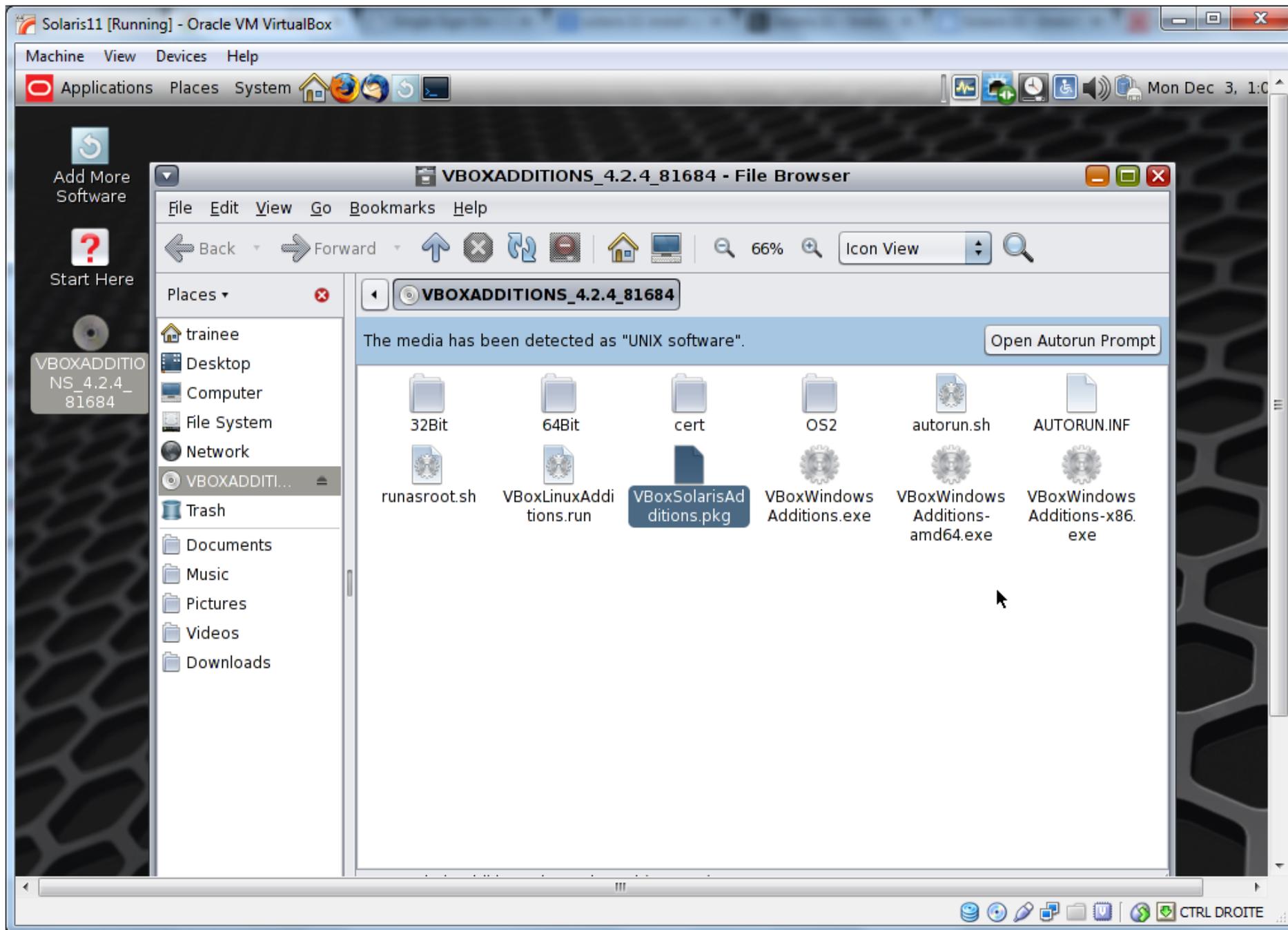
**Additions** menu item. VirtualBox will mount the VirtualBox Guest Additions ISO and an icon will appear on your desktop:
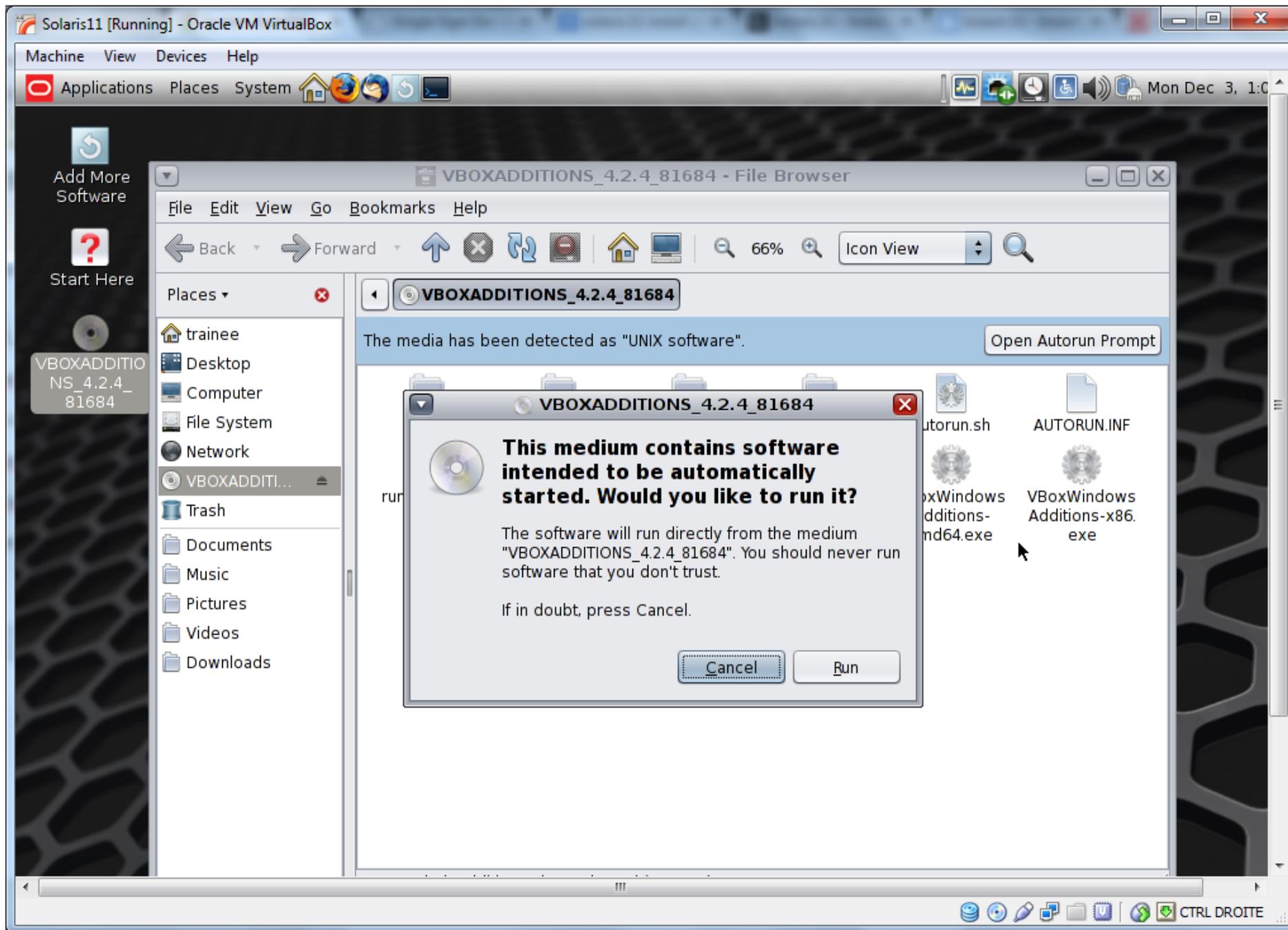
Double click on the icon to open the window containing it's contents:
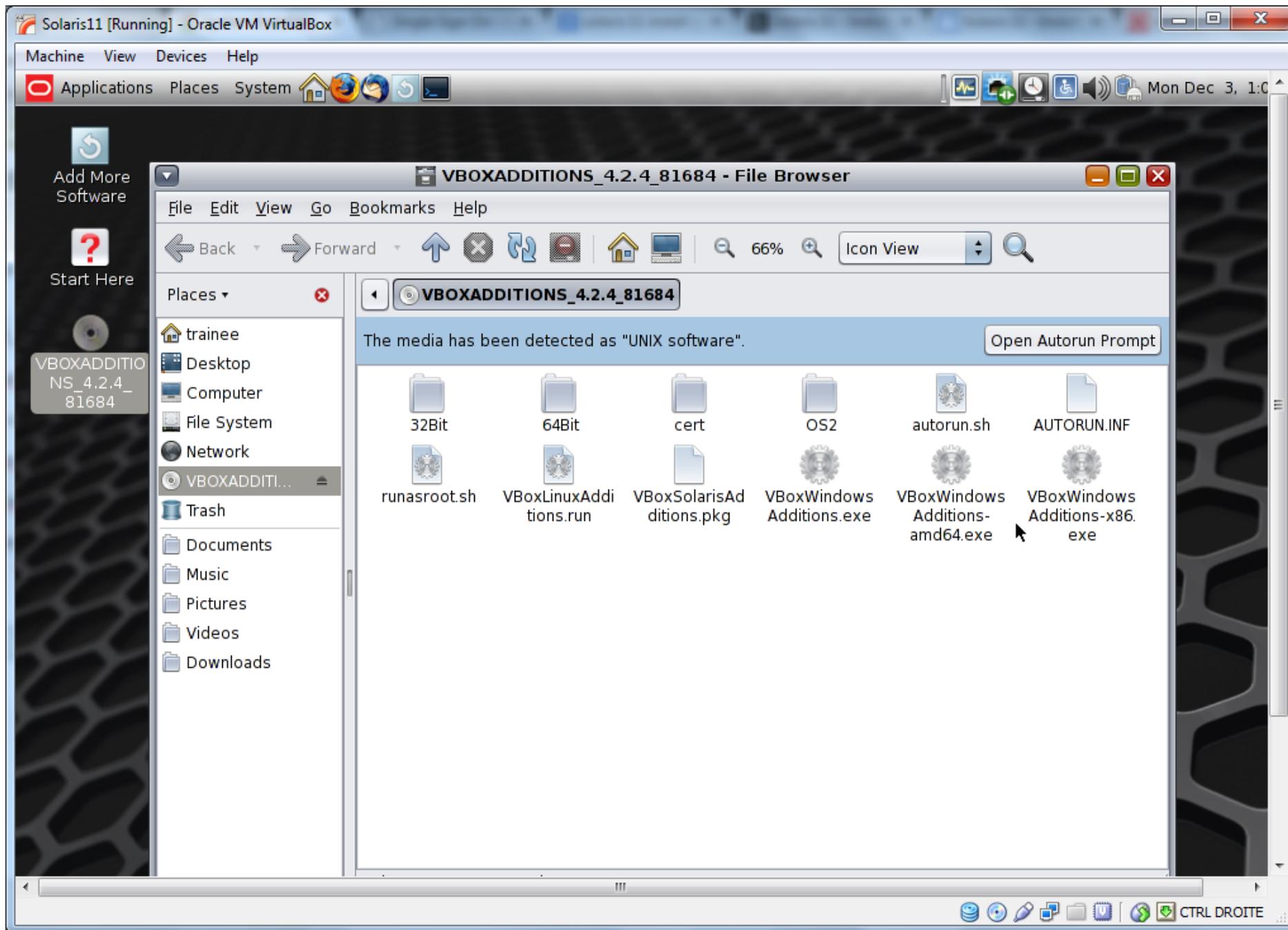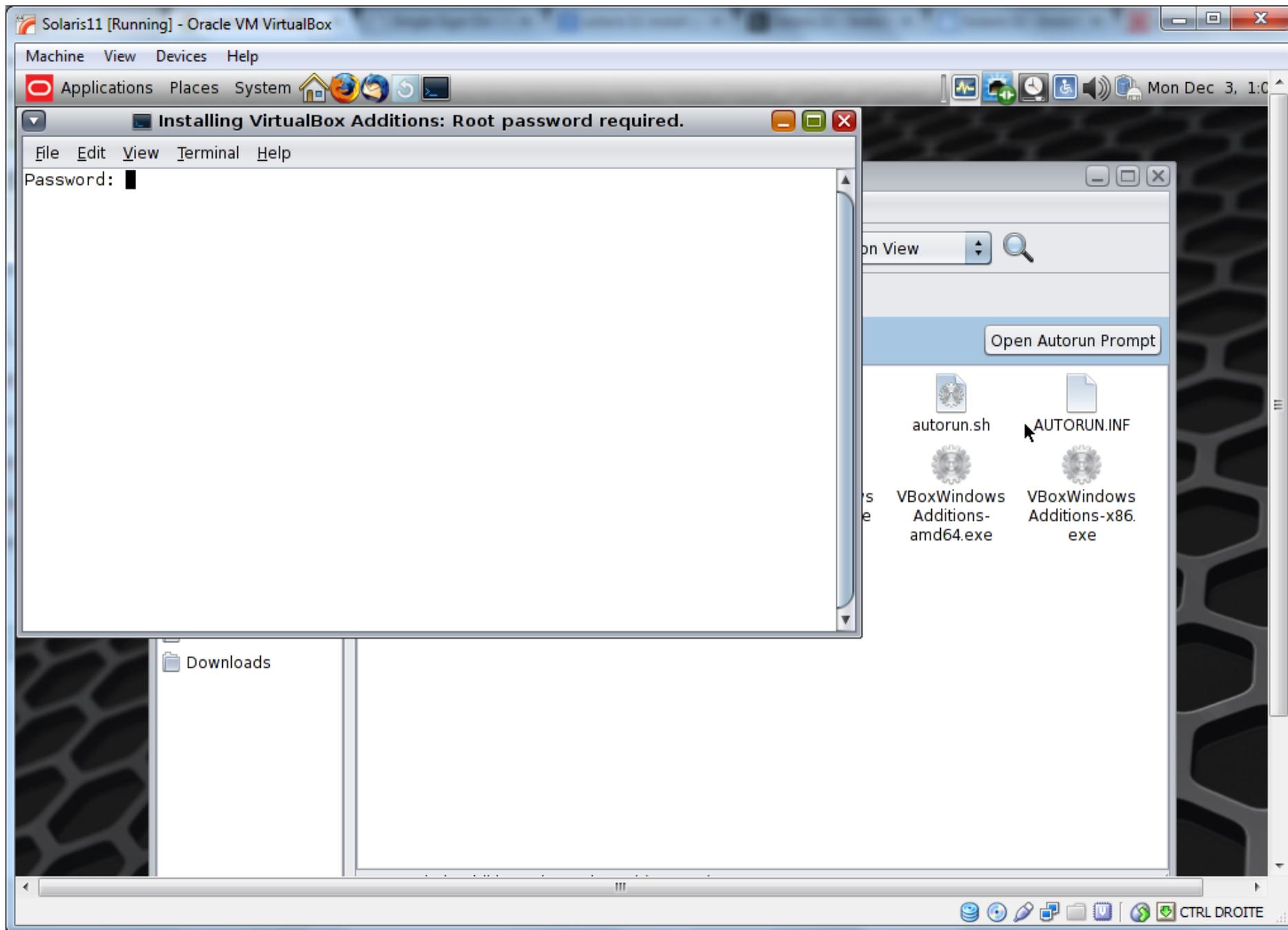
Highlight the **VBoxSolarisAdditions.pkg** package and click on the **Open Autorun Prompt** button:
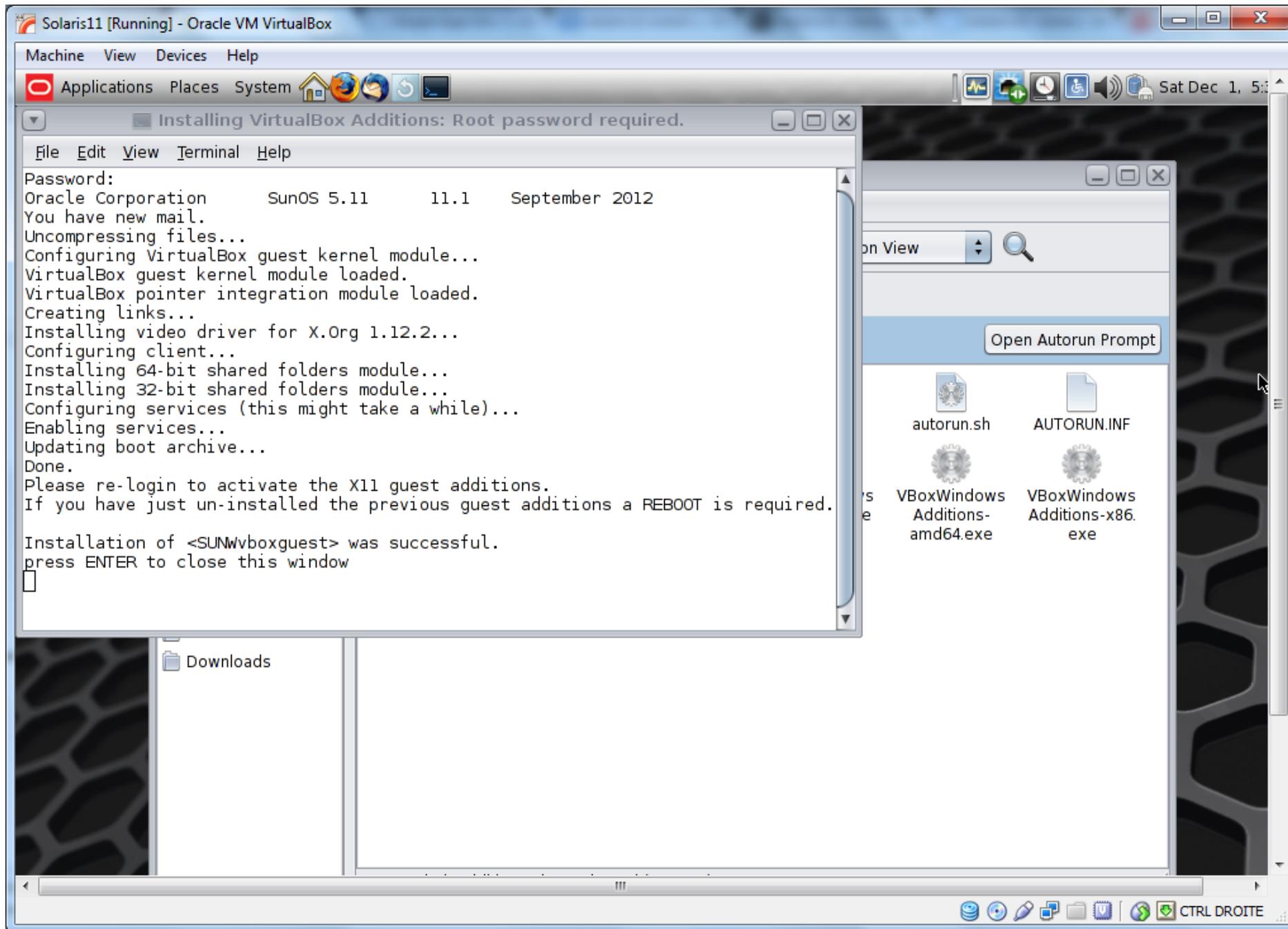
In the pop-up box, click on the **Run** button:

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

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

Solaris11 [Running] - Oracle VM VirtualBox

Machine   View   Devices   Help

Applications   Places   System                   Sat Dec 1, 5:

**Installing VirtualBox Additions: Root password required.**

File   Edit   View   Terminal   Help

```
Password:
Oracle Corporation      SunOS 5.11      11.1      September 2012
You have new mail.
Uncompressing files...
Configuring VirtualBox guest kernel module...
VirtualBox guest kernel module loaded.
VirtualBox pointer integration module loaded.
Creating links...
Installing video driver for X.Org 1.12.2...
Configuring client...
Installing 64-bit shared folders module...
Installing 32-bit shared folders module...
Configuring services (this might take a while)...
Enabling services...
Updating boot archive...
Done.
Please re-login to activate the X11 guest additions.
If you have just un-installed the previous guest additions a REBOOT is required.

Installation of <SUNWvboxguest> was successful.
press ENTER to close this window
```

on View

Open Autorun Prompt

autorun.sh       AUTORUN.INF

VBoxWindows     VBoxWindows
Additions-       Additions-x86.
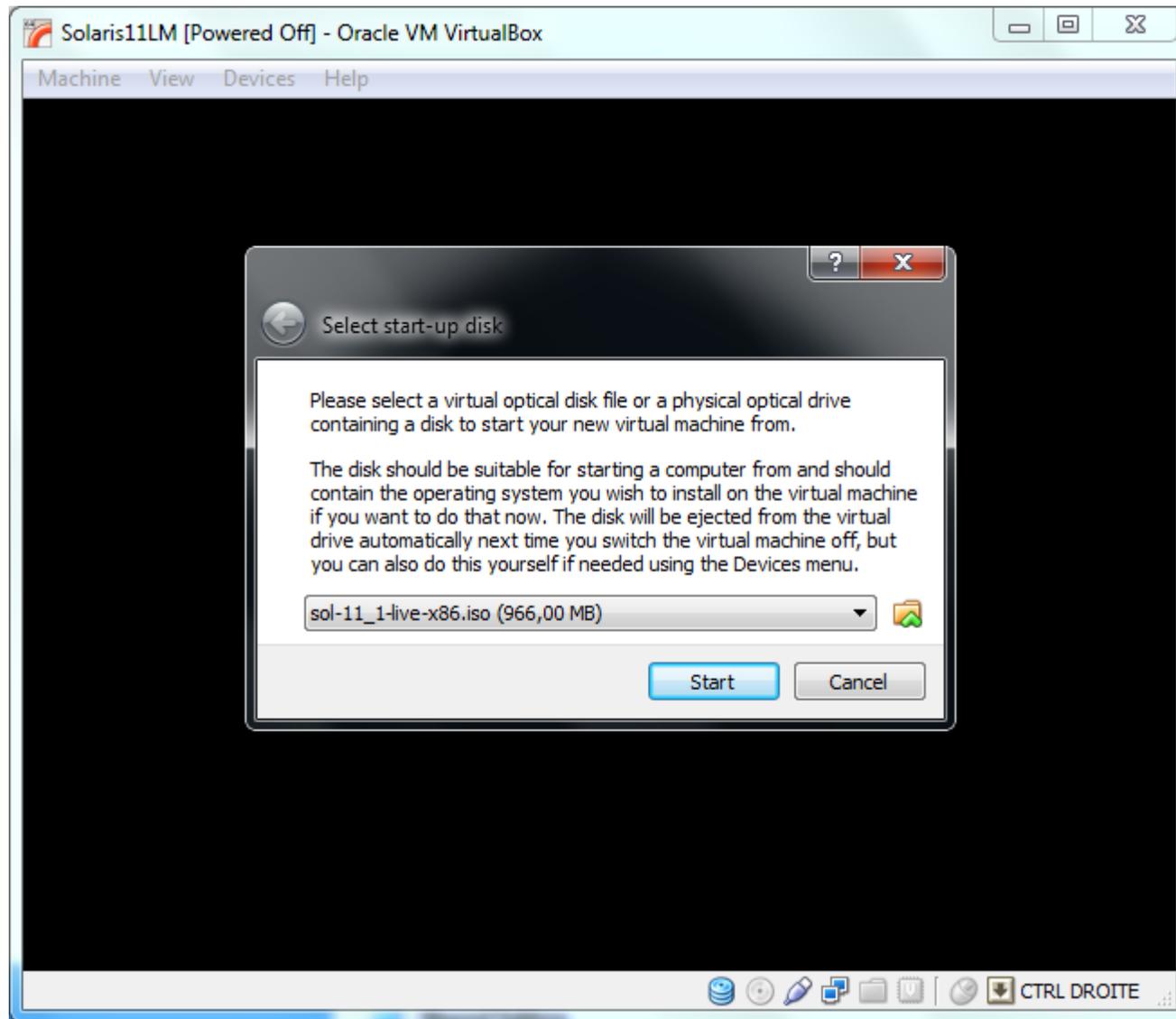amd64.exe        exe

Downloads

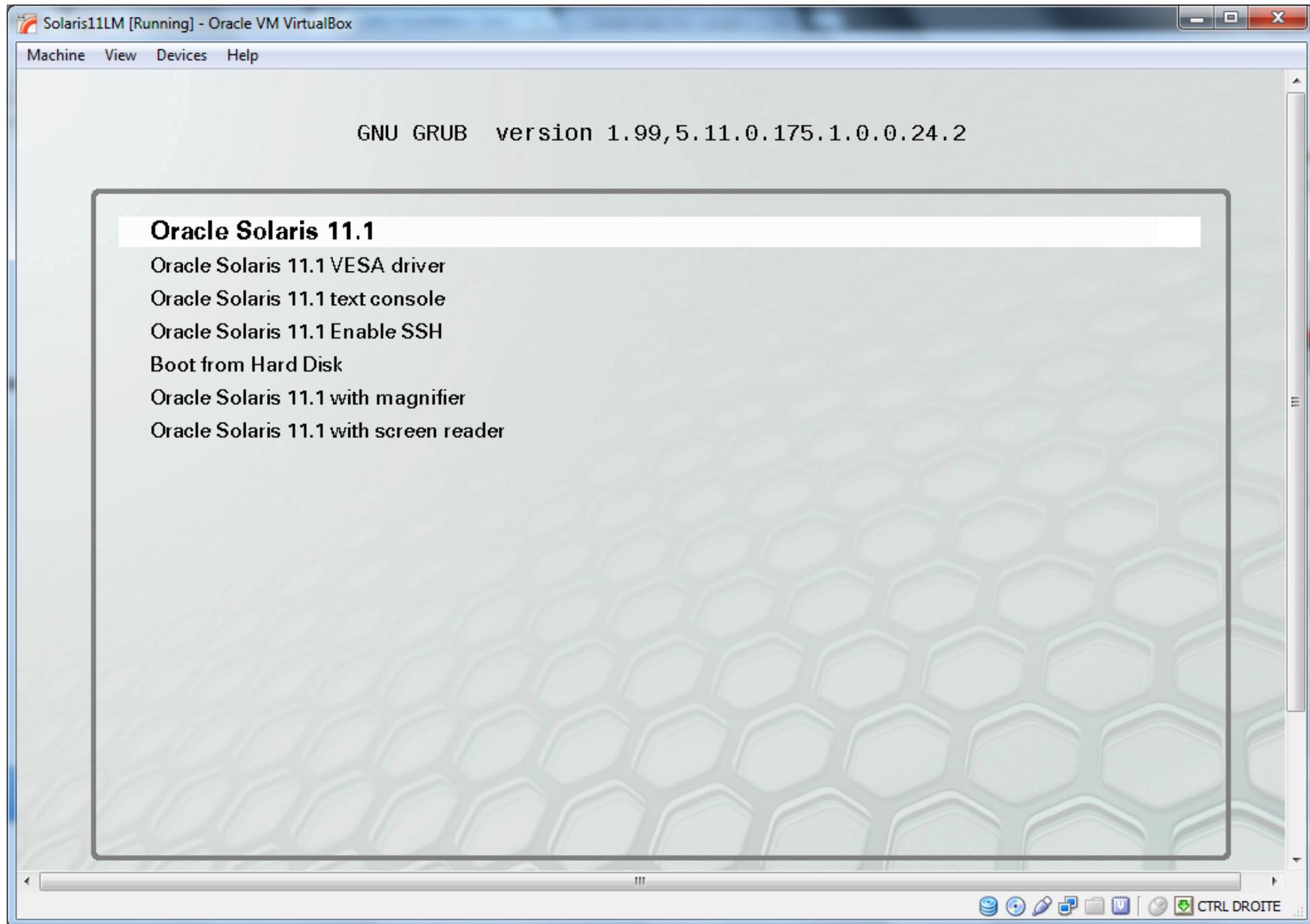CTRL DROITE

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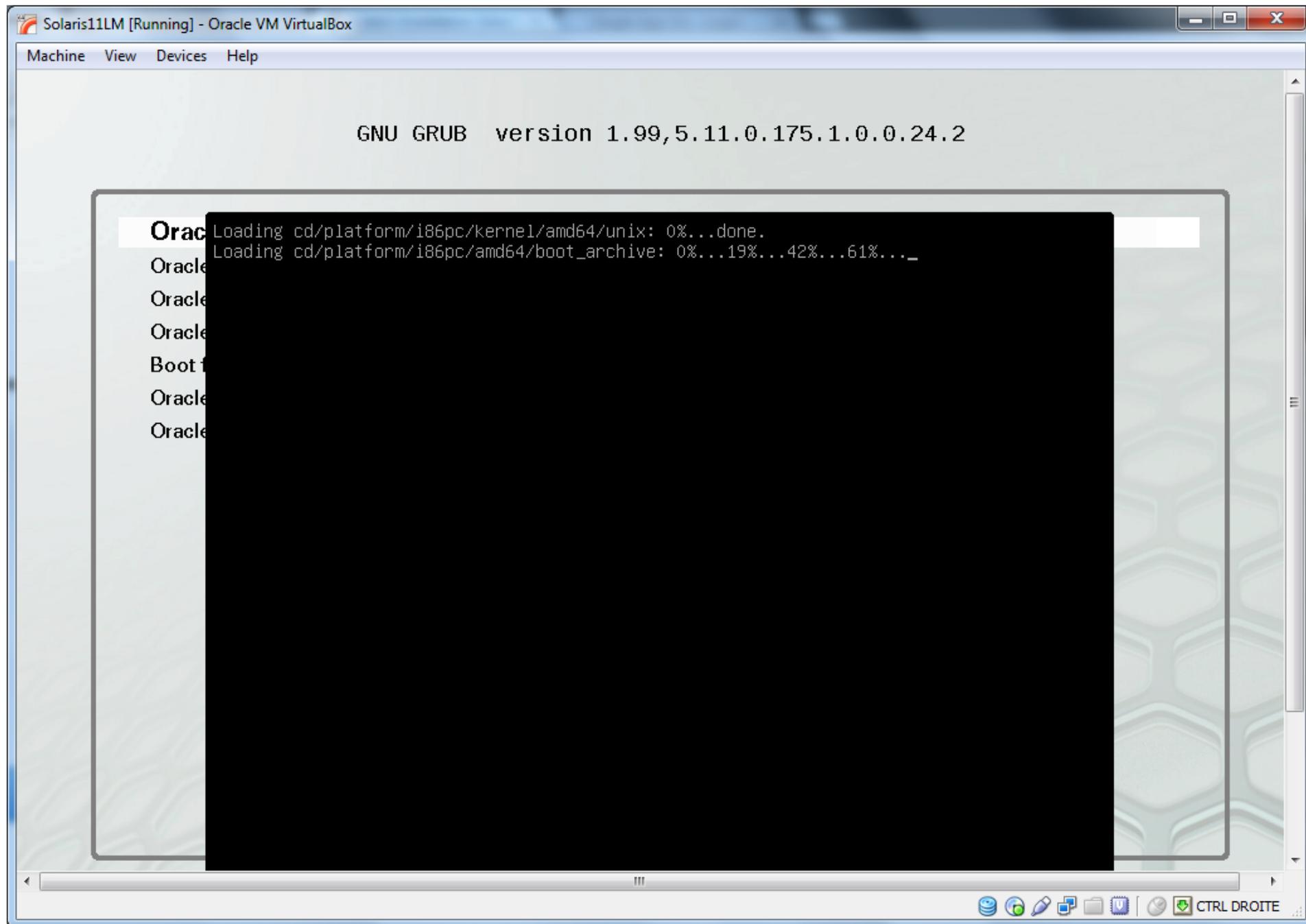
Start the new machine and tell it to boot the Live Media ISO:

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

```
                    GNU GRUB   version 1.99,5.11.0.175.1.0.0.24.2


        Oracle Solaris 11.1
        Oracle Solaris 11.1 VESA driver
        Oracle Solaris 11.1 text console
        Oracle Solaris 11.1 Enable SSH
        Boot from Hard Disk
        Oracle Solaris 11.1 with magnifier
        Oracle Solaris 11.1 with screen reader
```

The Live system will boot:

Solaris11LM [Running] - Oracle VM VirtualBox

Machine   View   Devices   Help

```
        GNU  GRUB   version 1.99,5.11.0.175.1.0.0.24.2


Orac  Loading cd/platform/i86pc/kernel/amd64/unix: 0%...done.
Oracle Loading cd/platform/i86pc/amd64/boot_archive: 0%...19%...42%...61%..._
Oracle
Oracle
Boot f
Oracle
Oracle
```

CTRL DROITE

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                    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]:
```

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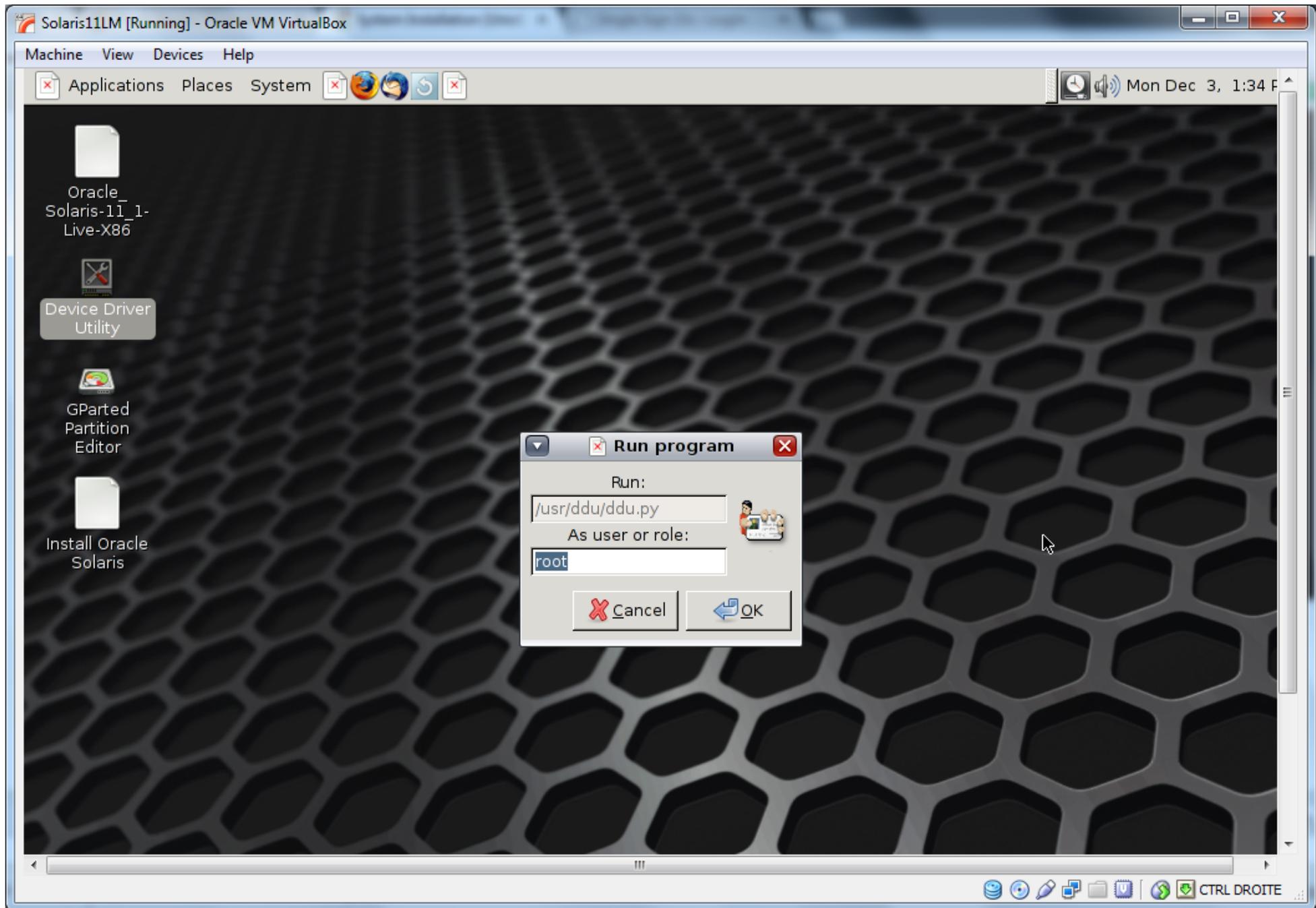
⚠️ When the system asks you to log in at the command line, do **NOTHING**. Wait until the graphical interface launches.

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:

Solaris11LM [Running] - Oracle VM VirtualBox

Machine   View   Devices   Help

Applications   Places   System   ⊠ 🦊 ✉ ↻ ⊠                                    🕐 🔊) Mon Dec  3,  1:37 P

**Device Driver Utility**

✅  **Driver Problems: 0**                                         ↻ Refresh

| Types | Device | Driver |
|-------|--------|--------|
| 🔊 Audio | Intel Corporation 82801AA AC'97 Audio Controller | audio810 |
| 🔋 Battery | innotek 50.0Wh VBOX 1 ( 100%  50.0Wh ) | acpi_drv |
| 💻 CPU | 1 X Intel(R) Core(TM) i7-3610QM CPU @ 2.30GHz, 1-core | --- |
| 💿 DVD | Intel Corporation 82801HM/HEM (ICH8M/ICH8M-E) SATA Controller [. | ahci |
| | VBOX CD-ROM | sd |
| 🖳 Memory | 2047M | --- |
| 🌐 Network | Intel Corporation 82540EM Gigabit Ethernet Controller | e1000g |
| 🖳 Storage | Intel Corporation 82801HM/HEM (ICH8M/ICH8M-E) SATA Controller [. | ahci |
| 🖳 USB | Apple Inc. KeyLargo/Intrepid USB | ohci |
| | Intel Corporation 82801FB/FBM/FR/FW/FRW (ICH6 Family) USB2 EHCI | ehci |
| | VirtualBox USB Tablet | hid |
| 🖳 Video | InnoTek Systemberatung GmbH VirtualBox Graphics Adapter | vgatext |
| 🔍 Other | System keyboard | kb8042 |
| | Standard LPT printer port | ecpp |
| | Microsoft PS/2-style Mouse | mouse8042 |

**Driver**

○ Package: [                              ]   solaris ▼

◉ File/URI : [                              ]   🗁 Browse...

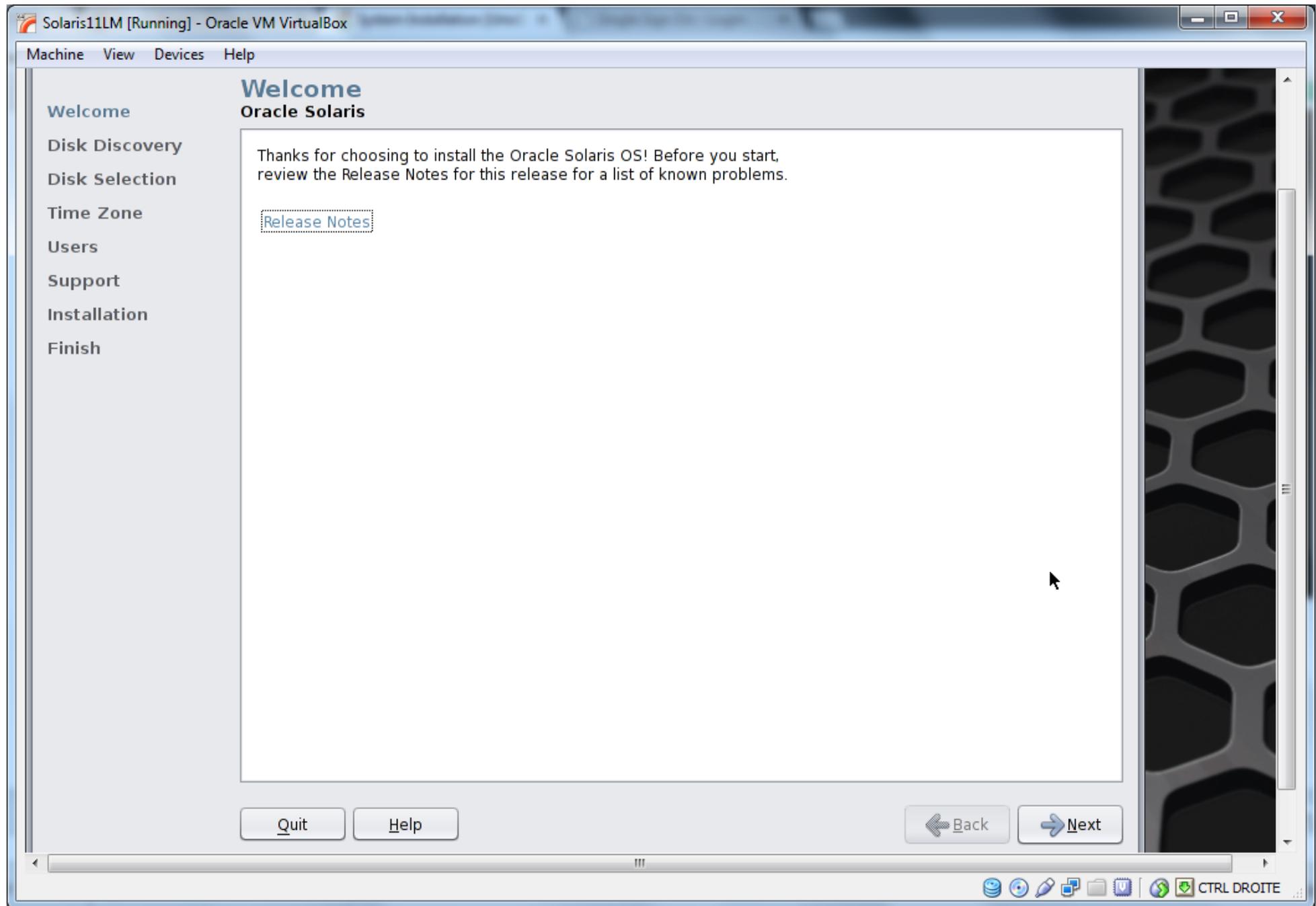🖴 ⊙ ✏ 🖧 🗎 🖳 | 🔘 🔽 CTRL DROITE

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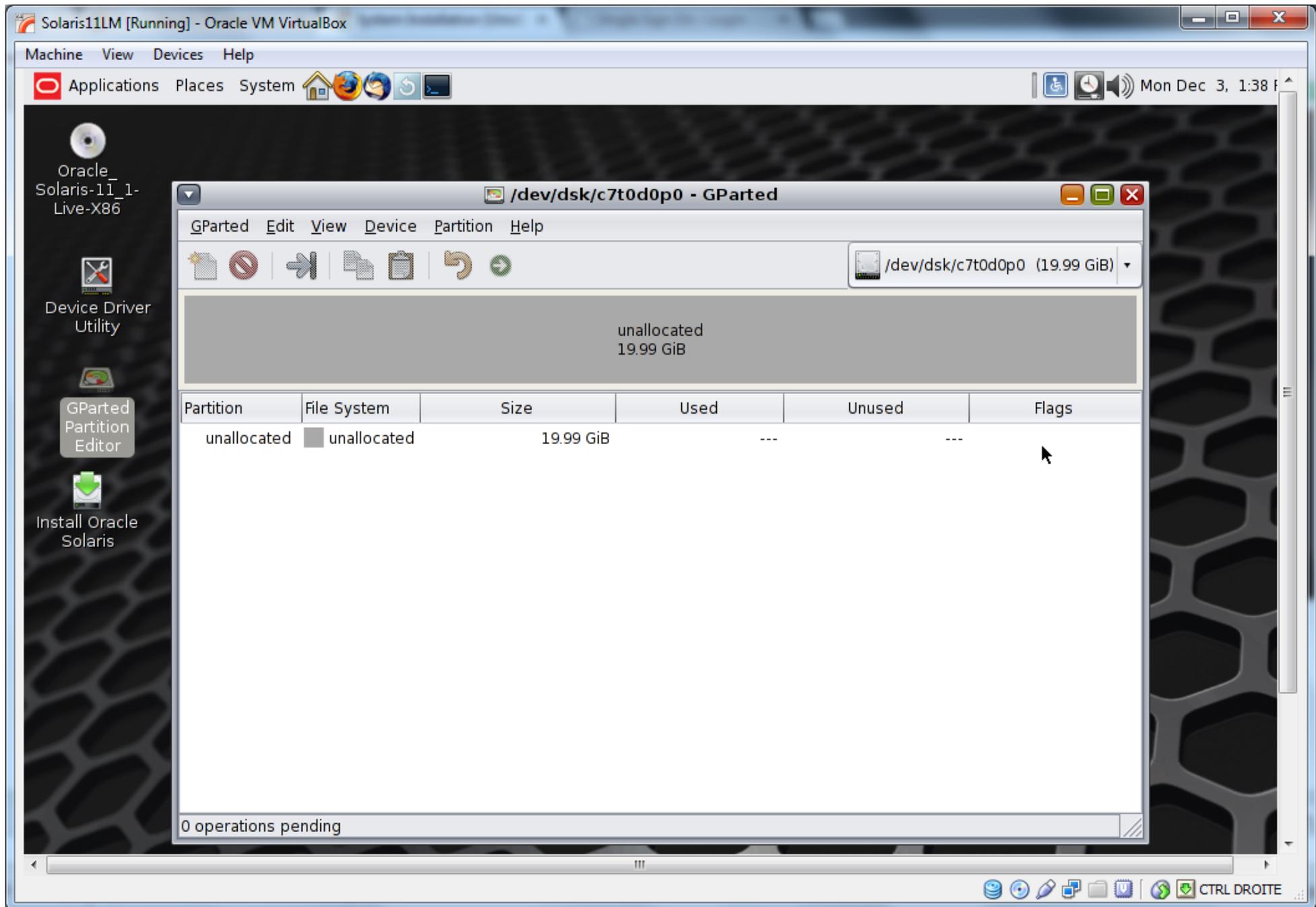
Close the GParted window and double-click on the **Install Oracle Solaris** icon:

Solaris11LM [Running] - Oracle VM VirtualBox

Machine    View    Devices    Help

## Welcome
**Oracle Solaris**

**Welcome**

**Disk Discovery**

**Disk Selection**

**Time Zone**

**Users**

**Support**

**Installation**

**Finish**

Thanks for choosing to install the Oracle Solaris OS! Before you start,
review the Release Notes for this release for a list of known problems.

Release Notes

Quit    Help    Back    Next

CTRL DROITE

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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