

The PCLinuxOS magazine

Volume 125

June, 2017



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On PCLinuxOS*

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From The Chief Editor's Desk...

This month's magazine cover, designed by Assistant Editor and graphics guru extraordinaire Meemaw, celebrates some of the "firsts" that occurred in the month of June. Depicted are: the First US Space walk by Edward White on June 3, 1965, Henry Ford's first operational car in 1896, the first drive-in movie theater in 1933, baseball's invention in 1839, the patenting of the bicycle in 1819, and the invention of the first "modern day" toothbrush in 1498 (although some contend that it goes all the way back to 609 A.D.).

I honestly feel like I must give a shout out to Meemaw. Without her, I'm sure I'd have given up long ago. When we need a cover for the magazine, we toss about some ideas and then a day or two later, there's an image in my Dropbox folder. Sometimes, we kick around some ideas for changes and improvements, but often times, her first draft is what we end up going with. She does this, month after month after month. Sure, I sometimes design an occasional cover, but I don't have anywhere near the graphics prowess that she has. Some of it is that I don't have time. Another part of it is that I don't possess the skillset that she does. And that is because I don't have the patience for learning it.

She helps proofread the magazine's article every month. She helps with the layout of the articles.



Every other month, we alternate the task of assembling the magazine PDF in Scribus. She does the odd number months, while I layout the even number month issues. She writes articles every month for the magazine. She creates the magazine's monthly puzzles. She sends out the monthly release notices to the Linux media outlets. She maintains contact with our regular columnists to get an idea of what articles we will have coming in each month. Those are just the things I can think of off of the top of my head. There are other things that she does that I have left out.

She takes a LOT of stuff off of my plate, and very reliably and dependably. Which is a good thing, because with two young kids to help raise, I'm finding I don't have as much time as I used to. Already, several things we like to do, such as bicycle riding (we haven't been on a bike ride in almost three years ... our bikes have sat mostly untouched during that time) and visiting family as often as we'd like, have been placed on an indefinite hold, thanks to our work schedules (mostly) and other

demands on our time. Couple that with maintaining a full time job at the hospital, trying to fit in "family time" whenever and wherever possible, gardening,

The PCLinuxOS magazine

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lawn care (more like lawn neglect lately), and everything else I've got going on, Meemaw makes it possible for me to keep going in my position as the magazine's chief editor. Without her, all of those other tasks she takes care of would be back on my task list, and would quickly become overwhelming. I simply wouldn't have sufficient time to carry on my chief editor duties AND all the things she takes care of.

So, I tip my hat to Meemaw, with unfulfillable and undying gratitude for all that you do!

Until next month, I bid you peace, happiness, serenity and prosperity.

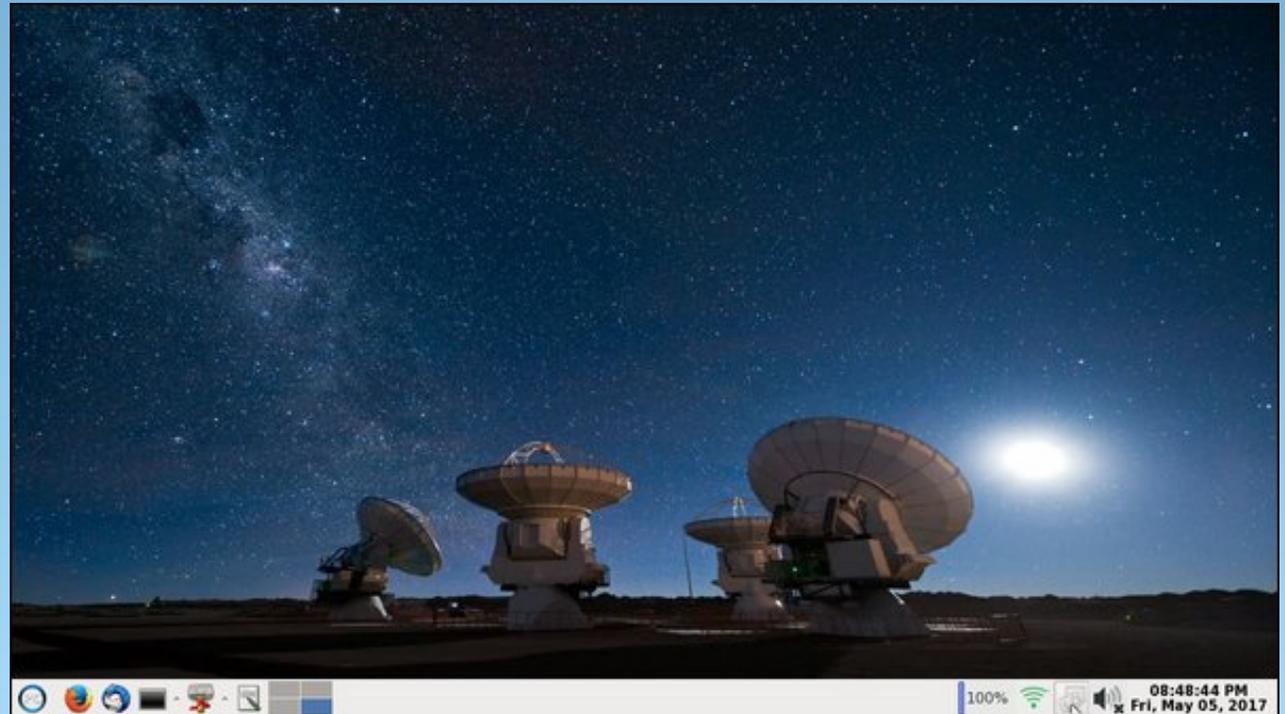


A magazine just isn't a magazine without articles to fill the pages.

If you have article ideas, or if you would like to contribute articles to the PCLinuxOS Magazine, send an email to:
pclinuxos.mag@gmail.com

We are interested in general articles about Linux, and (of course), articles specific to PCLinuxOS.

Screenshot Showcase



Posted by bhyeti, May 5, 2017, running Xfce.

An Un-feh-gettable Image Viewer

by Paul Arnote (parnote)

There's an image viewer that's been around since 1999 that many Linux users don't know about. I suspect that even many of those who do know of it often forget about it when they are looking for an image viewer. It is called **feh**. Although not typically part of a PCLinuxOS installation, feh is easily installed via Synaptic.

Despite its odd name, it is a powerful command line utility. It is a X11 viewer aimed mostly at command line users. On its [home page](#), feh bills itself as a "fast and light imlib2 based image viewer." More "enterprising" individuals can easily employ it as a file manager extension on Thunar, Caja and Dolphin/Konqueror, placing a powerful image viewer literally right at their fingertips.

On desktops where the background is not handled by the desktop environment, feh can even be used to control the desktop background wallpaper. Openbox and LXDE, for example, can be set up this way fairly easily since PCFileMan is commonly used on these desktops, and PCFileMan is typically set up to handle displaying the desktop wallpaper. On my computer running Xfce, xfwm controls the wallpaper, so the feh commands to display wallpaper don't seem to have any effect.

You can view the entire man page for feh by entering **man feh** at a command line, or by viewing the man page online [here](#) or [here](#). By looking at the rather in-depth feh man page (1002 lines in a terminal session when you display the man page there), you will discover that feh has many capabilities. For our purposes here, we're just going to cover the basics to introduce you to this powerful program. The man

page should be sufficient to help you explore feh's additional capabilities.

Feh can display all the image formats that are supported by imlib2. This includes JPG, PNG, XPM,



BMP, GIF, TIFF and TGA files. While primarily a command line program, images are opened in a window (or windows) on your desktop. From there, you can access some of the features of feh from a context menu that is accessed via a right click on the image.

Displaying images with feh is easy. At a command line, simply enter **feh <path/to/filename>**. But that might not be the most efficient method, especially if you're trying to view the typically large images from modern digital cameras. Feh will display the image at its native size, with the image viewing window full screen. This will mean that you will only see a portion of the image, unless you know how to use the keyboard to tweak the image display.

The keyboard controls are quite easy to use, as well. When faced with the need to zoom out on the displayed image, simply press the up or down arrow keys. The down arrow zooms out, while the up arrow zooms in. To scroll around the image without changing the zoom level, try holding down the CTRL key while pressing the arrow keys. Pressing the ALT key in combination with the arrow keys is akin to pressing the Page Up and Page Down keys in a text document, moving to the next screen's width (or height) viewport in the image. There is a whole list of other available keyboard commands in the feh man page.

Of course, you can exercise further control over how feh displays images by employing some of the feh command line switches. We can alter the command to execute feh so that we have control over the size of the feh image window. Entering the command **feh -g <width>x<height> <path/to/filename>** will set the feh window to the size specified by <width> and <height> values. By default, feh will also automatically zoom the image to fit it in the specified

window size. In fact, the exact command I used to display the image above was `feh -g 300x525 1026141605.jpg`.

Feh works on directories, too!

If you have your images sorted into directories, you have some other options when using feh. Feh will also offer you some additional capabilities.

If you travel to a directory that contains your images and type just `feh` at the command line prompt, feh will display each image in that folder, at full size (or 100% zoom). You can also pass a directory path as a command line parameter, if you'd rather not move to the directory containing your images you want to display. This is the feh slideshow mode. You move from image to image by using the left and right cursor keys. With today's camera resolutions, most pictures are too big to fit on your computer screen at 100% zoom. So, just issuing feh, by itself, on the command line prompt isn't going to be all that helpful – unless all of the images in your directory are already smaller in dimensions than your screen resolution. However, you can regain its usefulness by adding the command line switch `-.`, like this: `feh -.` This will still display the feh window taking up all of your screen real estate, but the image displayed will be zoomed to fit the window, with proper proportions.

Another option is to display the slideshow in fullscreen mode, without a window around the image. All of the images are automatically zoomed to fit on your screen. You do this by issuing the command `feh -F`. You will still have the use of the cursor keys to flip through your images. When you are finished viewing your slideshow, tap the "Escape" key to exit feh (the "Escape" key will always close feh).

You can automate the slideshow display by adding the `--slideshow-delay 5` command line switch. This will display each image in the directory for five



feh displaying images in multiple windows, with each image in its own window.

```
[parnote-toshiba@localhost RyanGrandpas-Oct2014]$ feh -l
NUM  FORMAT  WIDTH  HEIGHT  PIXELS  SIZE  ALPHA  FILENAME
1    jpeg    2340   4160    9M      2M    -      ./1026141605.jpg
2    jpeg    2340   4160    9M      2M    -      ./1026141606.jpg
3    jpeg    2340   4160    9M      1M    -      ./1026141606a.jpg
4    jpeg    2340   4160    9M      2M    -      ./1026141607.jpg
```

feh displaying a list of images in the current directory.

seconds. If you want the images to be displayed for a different amount of time (longer or shorter), just change the "5" to however many seconds you want each image displayed. So, the command `feh -F --slideshow-delay 5` will display each image in the current directory for five seconds as a fullscreen slideshow.

Feh will also display images from a file list that isn't unlike the *.m3u or *.pls playlists used with music player software. Just list the image files, in the order you want to display them, in a list. The format can be either absolute file paths and names, or filenames relative to the current directory (I suspect that absolute file paths and names would be less confusing than filenames relative to the current directory). Then, issue the command `feh -f filelist.lst`, replacing filelist.lst with whatever you named the image file list. Of course, you can combine this command line switch with other

command line switches, such as the `-.` command line switch to display images zoomed out to fit the window. The command `feh -F -f filelist.lst --slideshow-delay 5` will display all of the images in filelist.lst as an automated fullscreen slideshow that changes the image every five seconds.

If you want to open up the images in a directory, without the slideshow option but with each image in its own window, you can enter the command as `feh --multiwindow -g 300x400`. While each image will be in its own window, the windows will be stacked one on top of another. You will have to "peel" them apart, so to speak, moving them off of the top of one another by dragging each window with your mouse to a new location on your screen.

If you type `feh -l` (that's a lowercase L) at the command prompt (we'll assume you're entering the command at a command prompt IN the directory

An Un-feh-gettable Image Viewer

the 100% zoom level. Since this is probably best done from within an image directory, your command might look something like this (entered all on one line):

```
[parnote-toshiba@localhost RyanGrandpas-  
Oct2014]$ feh --thumbnails --thumb-height  
200 --thumb-width 200 --index-info  
"%n\n%wx%h" --output thumbnails.png
```

By saving the output, you have a type of “contact sheet” (that’s what we called them when I was a newspaper photographer) or image index. Opening the image (thumbnails.png in our case) in feh or any other image viewer, it behaves like any other image you might open to view. To get the clickable thumbnails again, just repeat the command above.

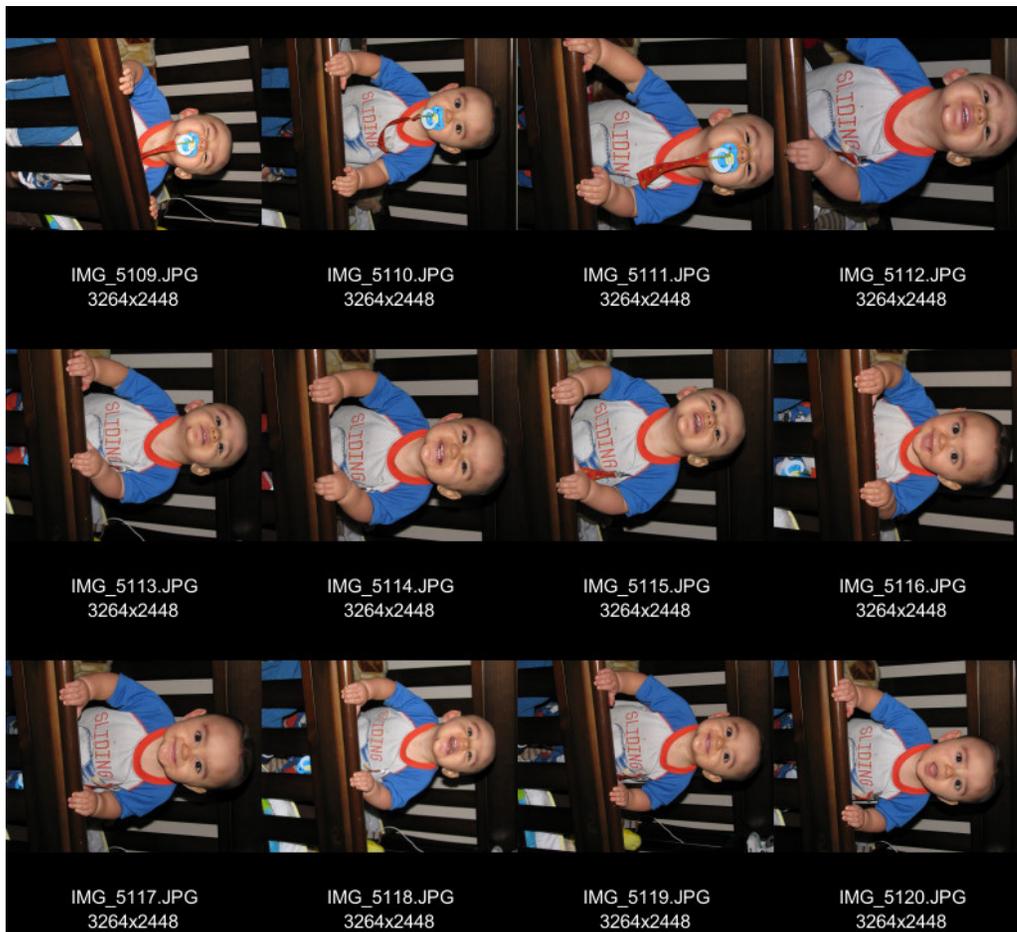
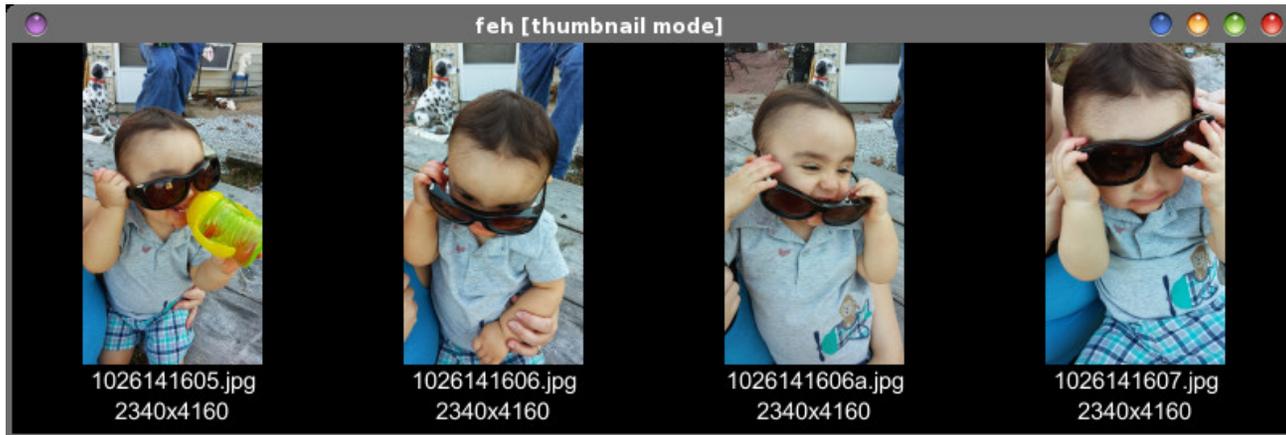
You can also create a “contact sheet” or image index by using another command line switch. Enter the command like this (all on one line, of course):

```
[parnote-toshiba@localhost Ryan-Pulling-Up-  
In-Crib-June-23-2014]$ feh --montage --  
thumb-height 200 --thumb-width 200 --index-  
info "%n\n%wx%h" --output montage.png
```

This command line switch, --montage, is just like the --thumbnails command, except that you don’t get the clickable thumbnails. Other than that, and the output filename, you end up with similar results – just sans the clickable thumbnails. You can limit the width or height of the montage image (the width defaults to 800 pixels), if you choose. I’ll refer you to the feh man page (links at the beginning of the article) for a complete list of special feh commands that can be used with the --montage command line switch.

Summary

As you can see, the oddly named feh can do quite a lot to help you with your image viewing needs. We haven’t covered all of feh’s capabilities, but what we’ve covered here should give you a good start. Some of the other options/capabilities are ones that I

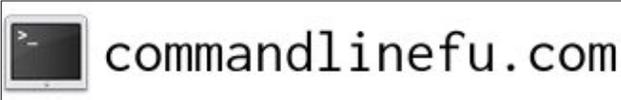


containing your images), you will get a list of all of the images in the directory, along with each image’s file format, dimensions, pixel resolution, and file size. You can easily redirect this output to a file in the directory, if you wish, simply by typing something along the lines of **feh -l > image-list.txt**.

You can also create a feh “thumbnail mode” window. Feh will display the images in the current directory as thumbnails in a special window, at the sizes you specify. Then, if you click on any image, that image is opened in its own window, at

feel would only be useful to the true command line commando, like deleting images. There are easier ways to delete image files using a GUI file manager. Plus, you'll want to be extra careful deleting images – because once they are gone, they are gone.

As a reminder, save yourself a whole lot of pain and anguish by performing irreversible image tasks ONLY on copies of images – never on the originals.



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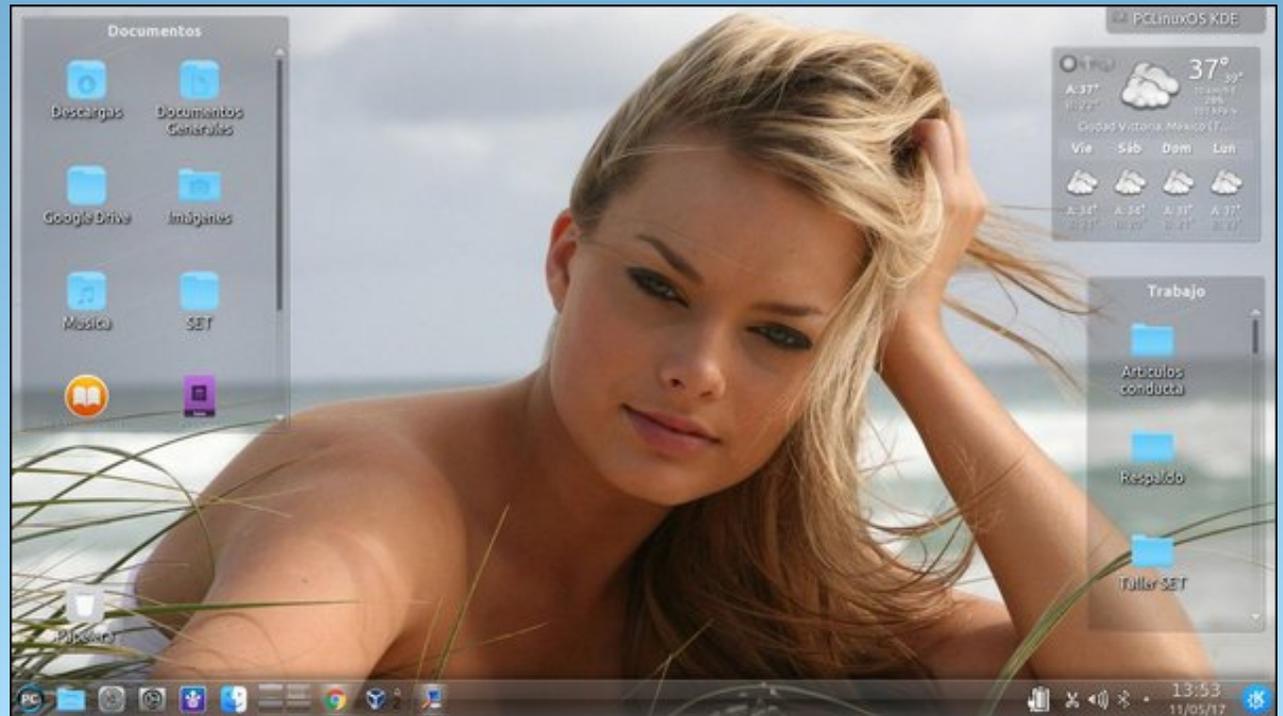
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Screenshot Showcase



Posted by Crow, May 11, 2017, running KDE.



Inkscape Tutorial: Create Tiled Clones, Part Three

by Meemaw

We've spent some time doing tiled clones for stars, shamrocks and confetti, and I hope you have experimented with your own projects to see what you can do. Each of those made use of the row and column concept. However, many of our designs are circular. Can we do that with tiled clones?

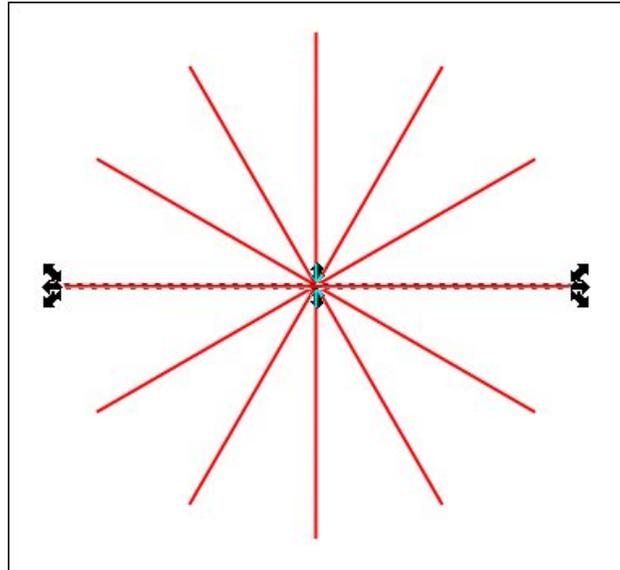
I actually went back to Inkscape's tutorials list and searched. In their Tips and Tricks section, [Inkscape Tutorials, Tips & Tricks](#), I found some instructions:

It's easy to see how to use the Create Tiled Clones dialog for rectangular grids and patterns. But what if you need radial placement, where objects share a common center of rotation? It's possible too!

This is where we use the **Rotation** tab. Let's create the start of a clock face. Open Inkscape and draw a line.

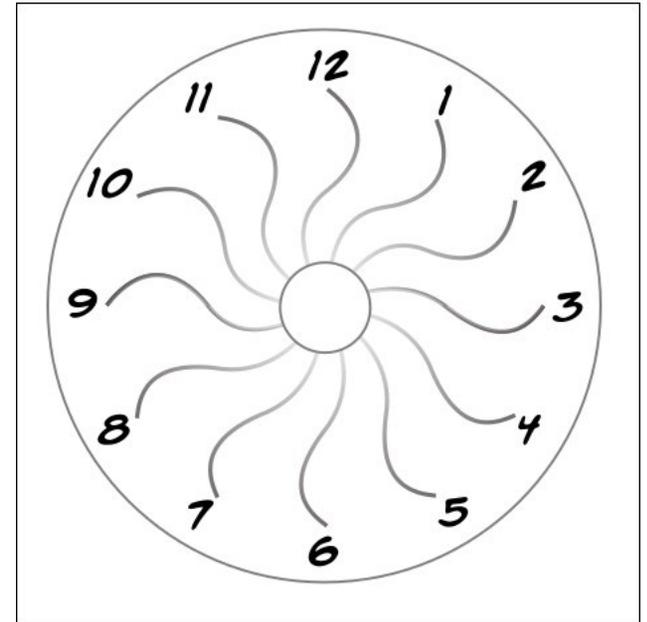
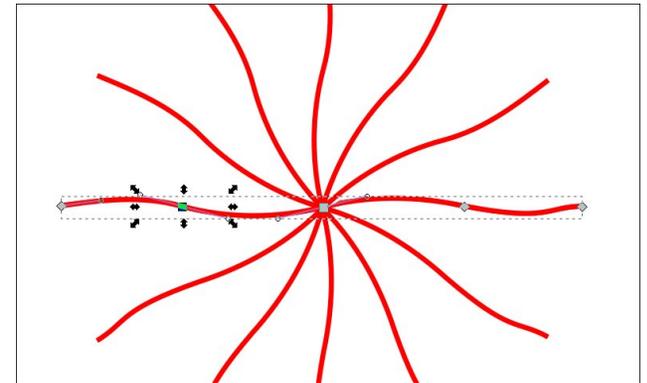


I want a line on each hour, so I want 6 lines (since we're rotating the line around the center of the starting line, we'll only need half as many), so set the rows to 1 and the columns to 6. Click on the **Shift** tab and set the **Per row/Shift Y** and **Per column/Shift X** both to -100%. Now click on the **Rotation** tab and set the column rotation to 30°. Click on **Create**.



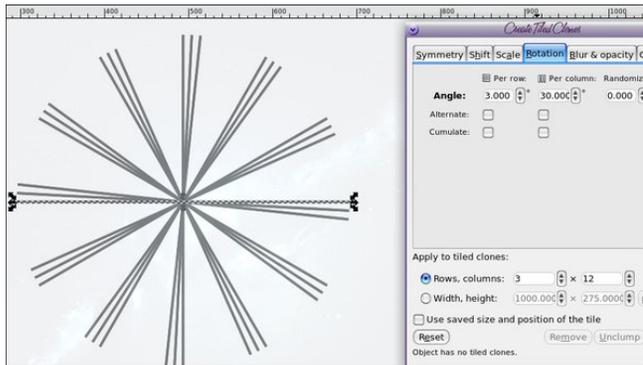
I want my clock face a bit fancier, so I'll zoom in on the original line (which should already be selected). Click on the **Paths** tool just under the selection tool at left, then double click on the line at the center and halfway between each end. I just moved the lines between the nodes a bit so my line looks a tiny bit curved. The great thing about doing this with your line and then cloning it (or doing it after it's cloned, like now) is that each clone will turn out exactly like the original. If you aren't happy, make changes to the original, and the changes will be made to the clones as well... I'd rather do it once than 6 times (top, right).

After messing with it a bit more, and adding the numbers and circles for decoration, my clock face, while not real fancy (or even to your liking), looks like this (right):



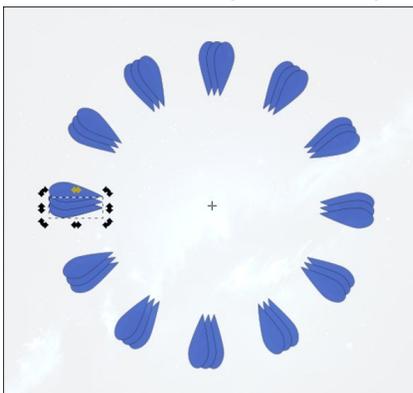
There are some presets in the program, so you could try the P3, P31M, P3M1, P4, P4M, P6, or P6M symmetries and see how they work out.

That was a relatively simple design. You can do more if you vary your row and columns, varying your rotation along with them. These settings (with the shift left at -100 like before), you'll get the result shown below.



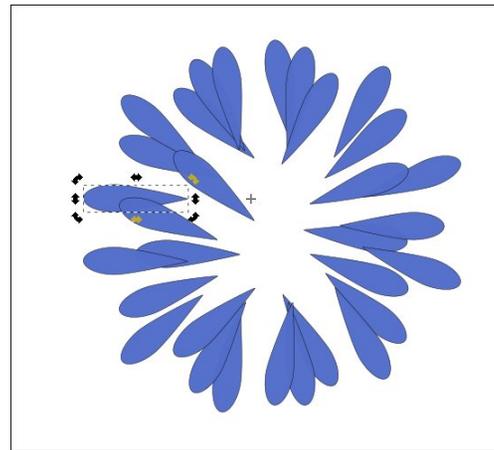
The groups of 3 are the rows, 3 degrees apart, and the groups are the columns, spaced 30 degrees apart.

What if you don't want to use only lines? This time I made a teardrop shape, and when I was satisfied with the design, I clicked on it twice to turn on the rotation arrows, then grabbed the cross in the center and moved it away. The cross is the center of rotation for the one object, and if I move it away from the center of the object, and use the exact settings we used before, then the clones will be arranged as shown below. Notice that the cross in the center was the one I moved from the original teardrop.

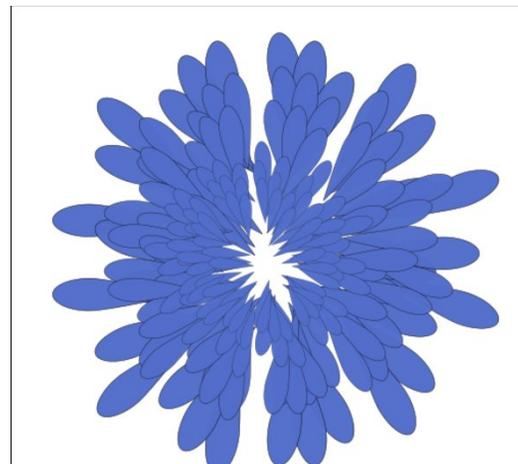


Let's try another. With the following settings, I obtained the figure below, which looks more like a flower than a starburst:

P1 Simple Translation with 3 Rows and 10 Columns Shift
 X 25% Row -100% Column
 Y -100% Row 25% Column
 No Randomize
Scale 0% all
Rotation Angle 20° Row and 40° Column



Duplicating a couple of times, and resizing the duplicates larger and smaller, and even rotating one of them, we end up with this:



To get a really full flower, we should duplicate it more.

This is just a sample of things that can be done with the Create Tiled Clones tool. Honestly, you should just experiment to get your desired result. Remember, the **Remove** button is at the bottom of the window, just like the **Create** button is. If you Create something that isn't what you want, just click Remove.



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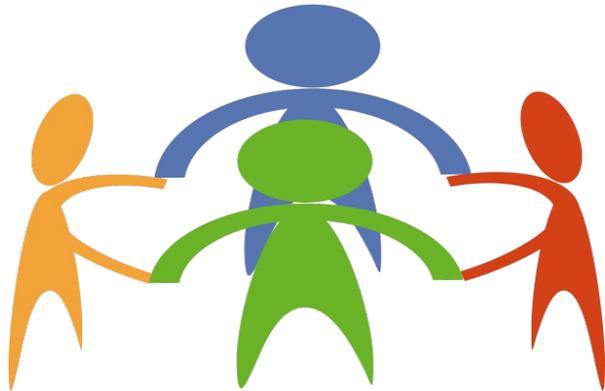
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ms_meme's Nook: Root By Our Side



Oh we don't need a barrel of money
For PCLOS honey
We'll boot along singing a song
Root by our side

No longer beg and borrow
No more trouble and sorrow
We'll boot along singing a song
Root by our side

Through our files and folders
We will have a ball
Never an error message
Never a reinstall

From that other OS we parted
A new path we charted
Just booting along singing a song
Root by our side

I wake up in the morning
Looking for a great deal
Need something dependable
With great appeal
That's how I feel about Linux
And I always will
I've found the best OS
It gives me a thrill

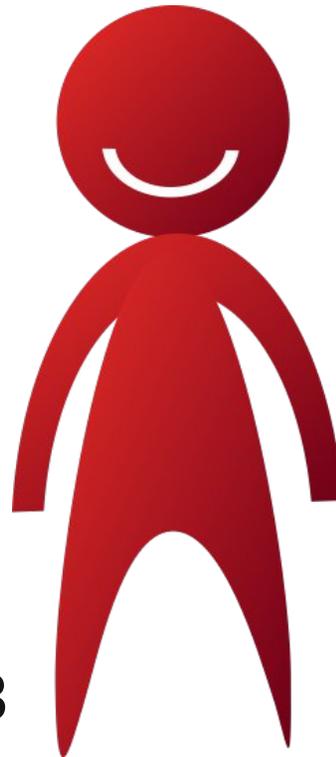


Oh we don't need a barrel of money
For PCLOS honey
We'll boot along singing a song
Root by our side

No more status quo
Easy come easy go
We'll boot along singing a song
Root by our side

Surfing through the net
We will have a ball
No antivirus
Will we need to install

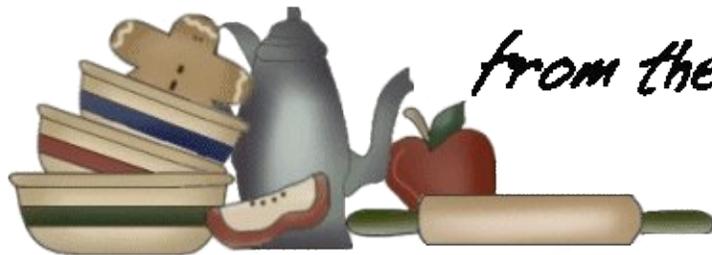
From that other OS we parted
Can't wait to get started
Just booting along singing a song
Root by our side



MP3

OGG

PCLinuxOS Recipe Corner



*from the kitchen of
youcantoo*

Skillet Chicken with Orzo and Olives



Ingredients:

4 chicken thighs (bone-in, skin on)
Pinch of salt and pepper
1 Tbsp olive oil
4 cloves garlic, minced
15 oz. can diced tomatoes
1/3 cup pitted kalamata olives
1/2 tsp dried oregano
2 cups chicken broth
1.5 cups uncooked orzo
1/4 bunch parsley (optional)

Instructions:

Pat the chicken thighs dry with a paper towel, then sprinkle both sides with a pinch of salt and pepper. Heat the olive oil in a large, deep skillet over medium heat. Once the oil is hot and shimmering, add the chicken thighs with the skin side down. Cook the chicken thighs on each side until golden brown (about 5-7 minutes each side), then remove to a clean plate.

Pour off the excess fat from the skillet, leaving just enough to sauté the garlic. Turn the heat down to medium-low, add the minced garlic, and sauté for about one minute, or just until the garlic is soft and very fragrant.

Add the diced tomatoes (with juices), oregano, and some freshly cracked pepper. Stir the tomatoes, herbs, and olives to combine and allow the juices from the tomatoes to dissolve any browned bits from the bottom of the pan. Roughly chop the kalamata olives, and add them to the skillet.

Add the chicken broth and orzo to the skillet, and stir to combine. Nestle the browned chicken thighs down into the skillet, place a lid on the skillet and turn the heat up to medium-high. Allow the skillet to come to a boil, then turn the heat down to low, or the lowest temperature needed to maintain a gentle simmer. Let the skillet simmer for 15 minutes with the lid in place.

Turn the heat off and let the skillet rest for 5 minutes. The tomatoes and olives will have risen to the top, so use a fork to gently stir or fluff the orzo, tomatoes, and olives back together. The orzo should be tender and slightly saucy. Pull the parsley leaves from the stems, roughly chop them, and sprinkle over top.

Notes:

*I used garlic and onion flavored diced tomatoes, but regular diced tomatoes will work as well.

**I use Better Than Bouillon concentrate to make my broth. One tsp Better Than Bouillon + 1 cup water = 1 cup broth.



VirtualBox: Going Retro On PCLinuxOS

by phorneker

If you have been around computers as long as I have, you will have a collection of software in storage on CDs and diskettes. This was certainly the case when I was rummaging through all my old belongings stored away from the last century.

My first computer was a Compaq Presario 425 with 4MB of RAM, a 200MB hard drive (IDE), and a single 3.5" floppy drive. The machine was an all-in-one 486SX where the monitor and CPU were integrated into one unit. The video chip was a Cirrus 3440, and there was a parallel port, a serial port, and a built-in modem which (thankfully) supported the Hayes AT command set, which was the standard for modem access at that time.

However, the audio chipset that was included was proprietary and was used only by the so-called voicemail software that was pre-installed as was the Windows 3.1 interface developed by Xerox at the same Palo Alto facility where the first graphical user interface was developed.

On that machine, I installed an original SoundBlaster audio card and disabled the built-in audio to get a real audio chipset.

Compaq (before the HP takeover) provided a utility that allowed the entire system to be backed up to thirteen diskettes, in addition to a Diagnostics diskette and a BIOS setup diskette which were included in the original packaging.

Besides the graphical interface and the voicemail software, a copy of PFS:WindowWorks 2.0 was preinstalled on the machine.

To this day, I still have the backup diskettes in storage, and can still be used inside VirtualBox.

Also, I have backed up PFS:WindowWorks to three floppies using InfoZIP to create three archives to store on diskettes (by compressing the contents of **C:\WINWORKS**). The productivity suite was preloaded onto the machine and no diskettes were provided, hence necessitating the need to use InfoZip.

As a separate task, I restored the contents of **C:\WINWORKS** into **~/wine/drive_c/Program Files (x86)/WINWORKS**, from the floppies then ran:

```
wine "~/wine/drive_c/Program Files \
(x86)/WINWORKS/EXEC/WINWORKS.EXE"
```

The quotes here are necessary as there are spaces in the filename of the executable.

I was expecting problems running this 16-bit Windows executable in Wine from the repository, but instead, PFS: WindowWorks launched as expected. All I needed to do was select **File** → **Print Setup** from the main menu. The CUPS drivers from the **cups-windows** package in the repository were available and ready for use.

PFS:WindowWorks is necessary as I have some old documents that are in PFS:WindowWorks word processing format, which happens to share the same file extension for word processing documents as WordPerfect 6.x, namely **.WPD**, though the file formats are completely different.

The abandonware website **WinWorldPC.com** has a copy of PFS:WindowWorks 1.0 available for download. This is a Windows 3.0 application that will run on Windows 3.1, OS/2 (32-bit versions) and Wine available from the repository.

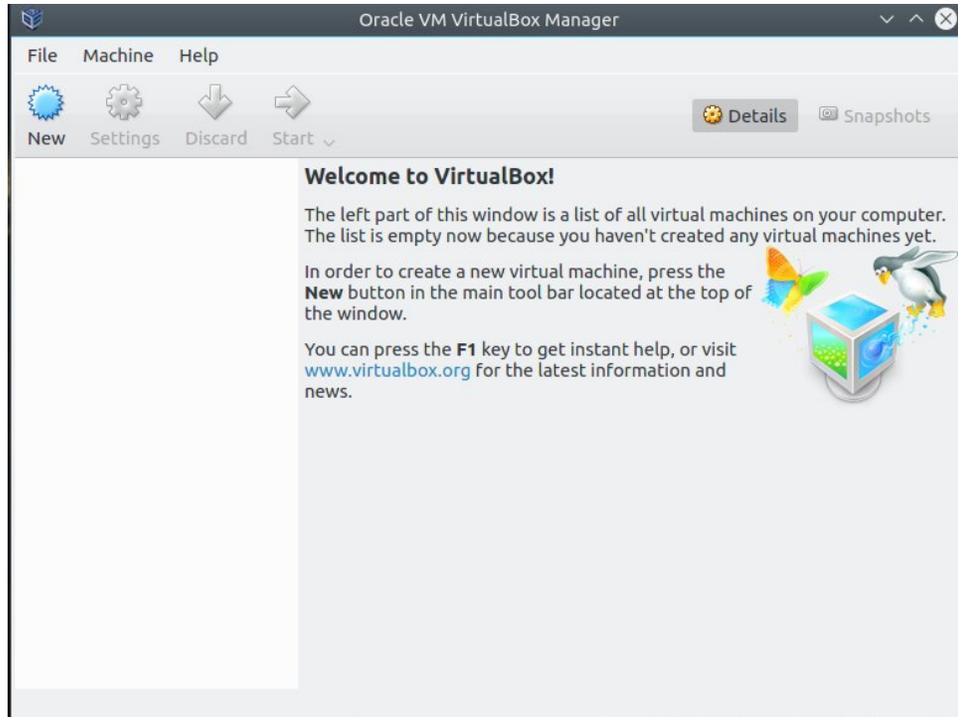
Getting VirtualBox

This is the easy part. VirtualBox Manager comes standard as a part of an official PCLinuxOS installation. Simply select **VirtualBox Manager** from the **More Applications** menu and follow the on screen instructions.

VirtualBox is installed from a self-extracting archive executed as a shell script. The application is installed first, followed by the downloading and installing of the corresponding Extension Pack to VirtualBox, followed by the compilation of the necessary kernel modules, and finally giving users permission to access VirtualBox (a group called **vboxusers** is created and all users on the PCLinuxOS machine are assigned to the group).

VirtualBox Manager performs all of these tasks for you in order to get VirtualBox running properly. When finished, all you need to do is to reboot PCLinuxOS and VirtualBox will be ready to use.

Select **Oracle VM VirtualBox** from the **More Applications** menu to launch VirtualBox.



This is what should appear the first time you launch VirtualBox. Right now, there is nothing to run as we have no operating systems installed inside VirtualBox.

Note: You can install PCLinuxOS inside VirtualBox provided the machine running VirtualBox has sufficient memory to support the host operating system **and** PCLinuxOS.

PCLinuxOS runs best with 4GB for KDE5, and 1GB for the MATE version, and that is just running on the host machine, let alone VirtualBox.

When you create a virtual machine inside VirtualBox, you are allocating memory from the host system to run the virtual machine. The more memory you give to the virtual machine, the less memory is available to the host machine to run applications.

Keep this in mind when you create virtual machines to run in VirtualBox.

Next, get FreeDOS

To create a virtual machine, we will need something to run on that virtual machine. Any operating system that can run on an Intel x86 processor (32 or 64-bit) will work (including PCLinuxOS). As we are going retro for this article, we can use CP/M-86, DOS, OS/2, or just about any UNIX-like operating system available since 1968, as long as it can run on a x86 processor.

DOS as we knew it was supposed to have been a dead platform (according to the powers that be at Microsoft). That could not be any further from the truth.

In fact, DOS never really went away.

Since 1981, the year that the original IBM Personal Computer (Model 5151) was introduced, there have been several variations on the product. DOS was originally known as QDOS (for Quick and Dirty Operating System) created by Seattle Computer Systems and purchased by Microsoft to market as the original MS-DOS.

Variants on DOS over the years have been available as follows:

- * IBM PC-DOS (1.0 through 7.0)
- * Compaq DOS
- * Toshiba DOS
- * Amstrad DOS (for Amstrad's line of IBM-Compatible computers)
- * Wendell DOS
- * Tandy 2000 DOS (for the ill-fated Tandy 2000)
- * Tandy MS-DOS (for Tandy 1000, 1200, and other IBM-compatible machines sold at Radio Shack)
- * DR-DOS/Novell DOS/Caldera DOS (Same product with multiple ownership)
- * Multiuser DOS
- * Concurrent DOS

Many of these variants can be found (and downloaded) at **WinWorldPC** as well as **archive.org** in its **The Old School Emulation Center** (TOSEC) section.

The latter has other interesting collections of software available for download, as well as a virtual arcade where you can revisit the 1980s when video arcades were popular places to hang out (and of course play video games without having to bring in a roll of quarters per visit.)

Of course, all of these versions of DOS are abandonware (and commercial when it was being developed actively). However, to be sure you get a DOS that really works as expected (and not have to worry about licensing and other legal issues), I recommend downloading **FreeDOS**.

The current version of FreeDOS installs similar to some Linux distributions. I recommend version 1.2 rather than 1.1 or 1.0. Versions 1.0 and 1.1 have a look and feel of a classic DOS installation. Version 1.2, however, is very polished and has a look and feel of an old school Linux distribution rather than a classic DOS installation, yet it still remains the same DOS we have known and loved for years.

The current version weighs in at 1.2GB, which means you will need a blank DVD to burn this distribution (if you wish to use FreeDOS in an old PC that happens to have a DVD-ROM drive). You can also install it to a USB flash drive. The developers of FreeDOS have placed emphasis on getting many USB devices to work as USB as DOS itself predates USB.

Thankfully, in VirtualBox, you do not need to worry about USB devices working with FreeDOS as by default VirtualBox does not provide a USB controller to virtual machines running DOS. (The virtual machine can be configured to include a USB controller, but why would we want to do that in DOS?)

After downloading (to **~/Downloads** unless you told your web browser to save the file elsewhere), there should be a file called **FD12INS.ISO**. This is the installation disc for FreeDOS. This DVD image is bootable, so no floppy is needed to get FreeDOS started on machines that can boot from a DVD.

I recommend burning **FD12INS.ISO** to a DVD as the disc access in VirtualBox from a physical DVD drive is much faster than disc access in VirtualBox from a ISO image. When it comes to diskettes, the opposite case is true.

VirtualBox does not require a floppy diskette to start FreeDOS. If you must have a floppy diskette for another machine, you can download it from the FreeDOS website, or you can copy it from the **BOOT** directory of the FreeDOS DVD. If you choose the latter, you will need to use **dd** to copy the image to a blank diskette.

FreeDOS 1.2 is a complete DOS distribution containing not only DOS, but utilities most users will need, networking software including TCP/IP stacks (WATTCP and MTCP) and network applications, a few games and multimedia applications, the OpenGEM desktop, (and two other lesser known graphical desktops for DOS), a set of file archivers to handle most any file archive available on the Internet, and a suite of development tools, namely the DJGPP Development System, OpenWatcom, FreeBASIC, FreePASCAL, Regina REXX, Netwide Assembler, FASM (for Fast Assembler), JWASM (compatible with Microsoft Assembler), Lua, Euphoria and some lesser known utilities.

Euphoria is an interesting programming language that is available for Linux, but there is only a 32-bit version available. If you have the ia-32 package installed from the repository, you should be able to run Euphoria from the package available for download.

The same is true for the **Squeak** implementation of Smalltalk-80 which is used to implement the **OpenCobalt** environment for 3D computing. There is a 64-bit experimental version of Squeak available, but it has not been thoroughly tested, and I would not trust that for use with PCLinuxOS. The 32-bit version, however, works like a charm.

While these packages will work on PCLinuxOS, **keep in mind the well given advice about installing packages outside the repository.**

These examples work as I have *successfully tested them* with my installation. Your mileage may/will vary.

Linux versions of Lua, FreePASCAL and Regina Rexx are installable from the repository.

The development tools on the FreeDOS DVD can be used in DOSBox as well as in virtual machines running OS/2, Windows 9x, NT 4.0, 2000 and XP.

Now, Let us build a Virtual Machine

Now that we have VirtualBox installed and have a copy of FreeDOS, we can now create a virtual machine and install FreeDOS on it.

Click on **New** to get started building a new virtual machine for FreeDOS.



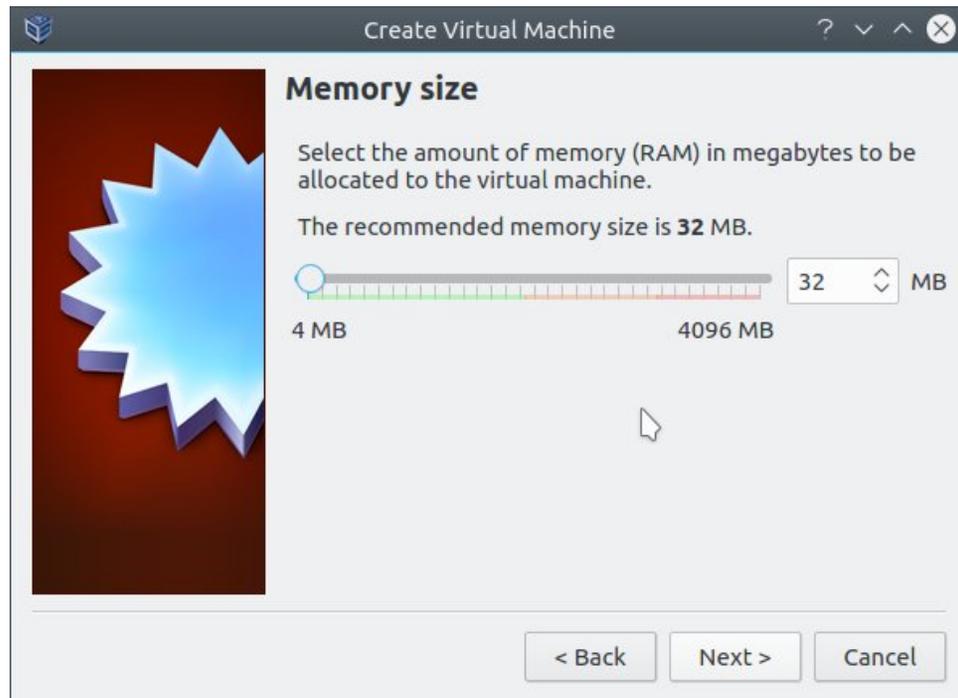
There are three fields that need to be filled out. You can call your virtual machine anything you want. However, VirtualBox will attempt to determine the operating system type and version based on what you type into the **Name** field.

Since we are using FreeDOS 1.2 for this article, it only makes sense to call the virtual machine **FreeDOS 1.2**. By default, the type field is set to **Microsoft Windows**, and Version is set to **XP (x86-32)**. This is because most users of VirtualBox since its inception installed the 32-bit version of Windows XP as a guest operating system.

When we typed in **FreeDOS 1.2** in the **Name** field, the type changed to **Other** and version was changed to **DOS**. VirtualBox has detected from what we put in that we intend to install a version of **DOS** in this virtual machine.

There is an **Expert Mode** button. This allows you the option of creating a new virtual hard drive, importing an existing virtual hard drive image, or not using a virtual hard drive at all. The last option could be useful for testing Live-CD/DVDs to see if that particular operating system will run in VirtualBox at all.

Click on **Next** to continue.



This screen allows you to specify how much of system memory to allocate to this virtual machine. VirtualBox has recommended sizes which are set as defaults depending on which operating system you are installing.

FreeDOS does not require much in terms of memory to run. VirtualBox recommends 32MB of memory to run FreeDOS which should be more than enough memory to run DOS applications. The same holds true for the following:

- * IBM PC-DOS (all versions including DOS 2000)
- * MS-DOS
- * DR-DOS/Novell DOS/Caldera DOS (all the same product with different license ownerships)
- * Compaq DOS
- * CP/M-86 and Concurrent CP/M (which evolved to DR-DOS)
- * Windows 1.x through 3.11
- * OS/2 1.x (Joint Microsoft and IBM product)
- * IBM OS/2 2.0, 2.1 and 3.0 Warp

Click on **Next** to get to the disk settings.



Here you have the option to not use a hard disk, to create a new virtual hard disk, or to import an existing virtual hard disk. The first option makes absolutely no

sense for FreeDOS, so we shall not even consider that option. The third option is used if you already have a virtual disk file that can be used in VirtualBox.

For this article, we shall use the second option, which happens to be the default chosen here.

VirtualBox recommends 500MB for FreeDOS.

That figure is based on the maximum size of hard disk available that can work with the long obsolete ATA controller that was common in PCs of the 1980s and early 1990s (before SCSI and IDE became standards for storage controllers). ATA controllers could support a maximum hard disk size of 504MB. (Yes, that is megabytes, not gigabytes.)

While VirtualBox recommends 500MB for FreeDOS, you can use any amount of disk space you want or require depending on the application(s) running in FreeDOS.

Click on **Create** for the next step.



Here you can choose a smaller disk image size to start (having that size grow as the disk storage needs grow), or allocating all required disk space from the start.

Selecting the **fixed size** option will create a virtual hard disk the size you choose. This will take longer to create, but will be faster to access as disk space will not need to be allocated during FreeDOS operation.

It is OK to choose either option as it really makes no difference in the performance of FreeDOS in VirtualBox. It is just a matter of whether you want a smaller virtual disk to start or all space allocated at the start. The dialog box here better explains this than I can.

Click on **Next** to get to the next step.



For this option, I would choose the default setting here. The other options can be explained in another issue and have to do with the types of virtual disks that can be used by VirtualBox.

Click on **Next** to choose the size of the virtual hard disk.



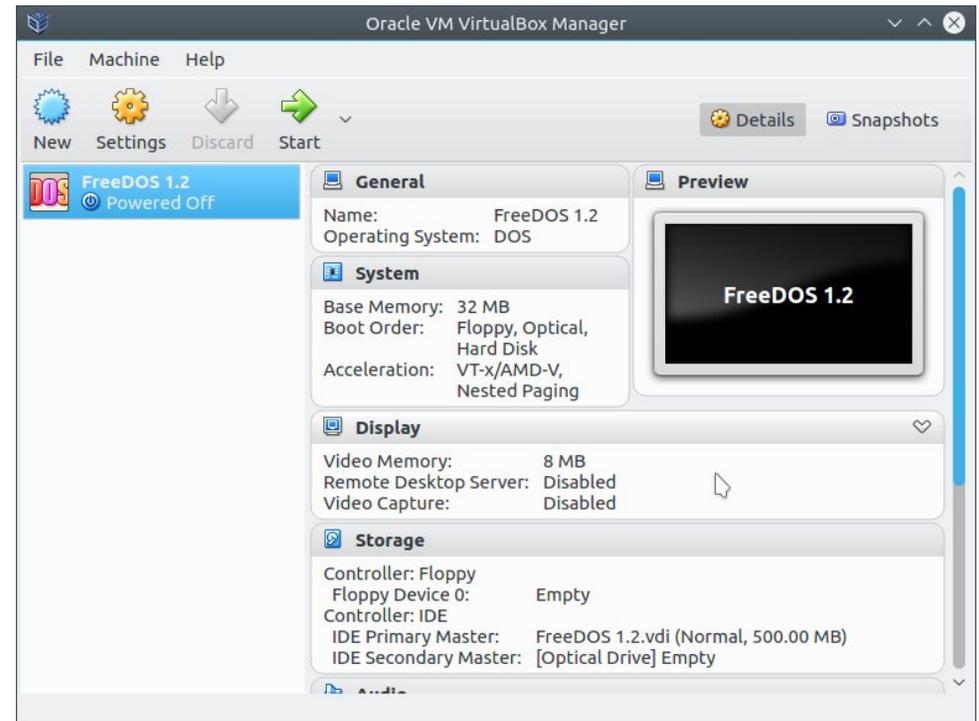
Here you can change the size of the virtual disk file. For FreeDOS 1.2, the default is 500MB. You can increase that as much as you wish, provided you have *sufficient physical disk space* available on your hard drive to allocate the virtual hard disk.

DOS itself imposes a limit of 2GB for FAT partitions. This is true for MS-DOS versions through 6.22 and IBM DOS versions through 6.3. Starting with Windows 95 (which is really MS-DOS 7.0) and PC-DOS 7.0, support for FAT32 was available.

FreeDOS and Windows 2000 through 10 support partitions up to 137GB.

Once you have chosen a disk size for your virtual hard disk, you cannot change it after it has been created. Therefore, plan your FreeDOS disk storage needs accordingly.

Click on **Create** to create your new virtual hard disk and virtual machine.



Now your virtual machine for FreeDOS 1.2 has been created.

Before we start up that machine, it must be configured. Just as a real PCLinuxOS machine has internal and external peripherals that must be configured, virtual machines in VirtualBox must also be configured.

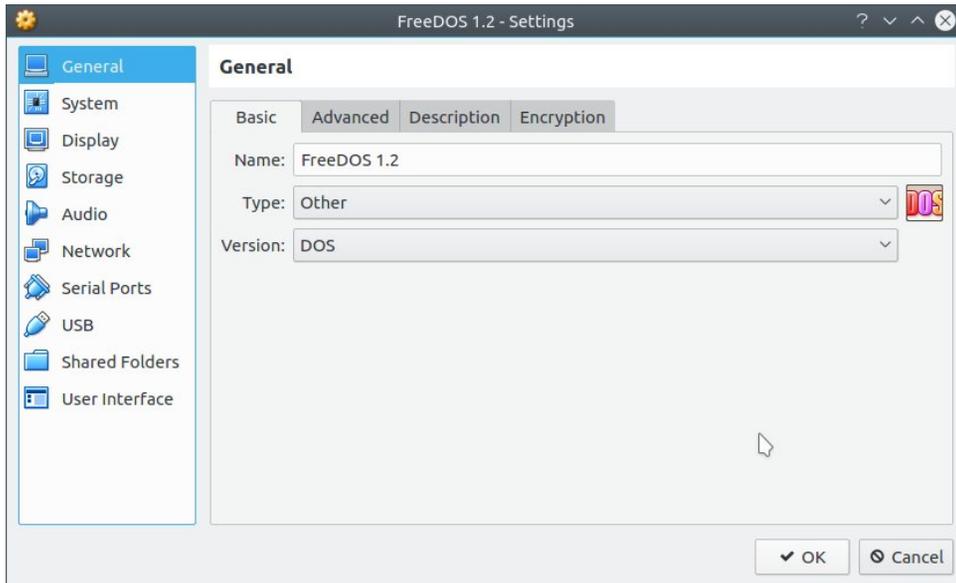
What Hardware is Emulated in VirtualBox

To configure the virtual machine, we shall click on **Settings**. (You can also right click on the name of the virtual machine and select **Settings** from that menu.)

Most of these settings do not need to be changed to get FreeDOS to run. There are some settings of interest that effect what can be done in FreeDOS in VirtualBox.

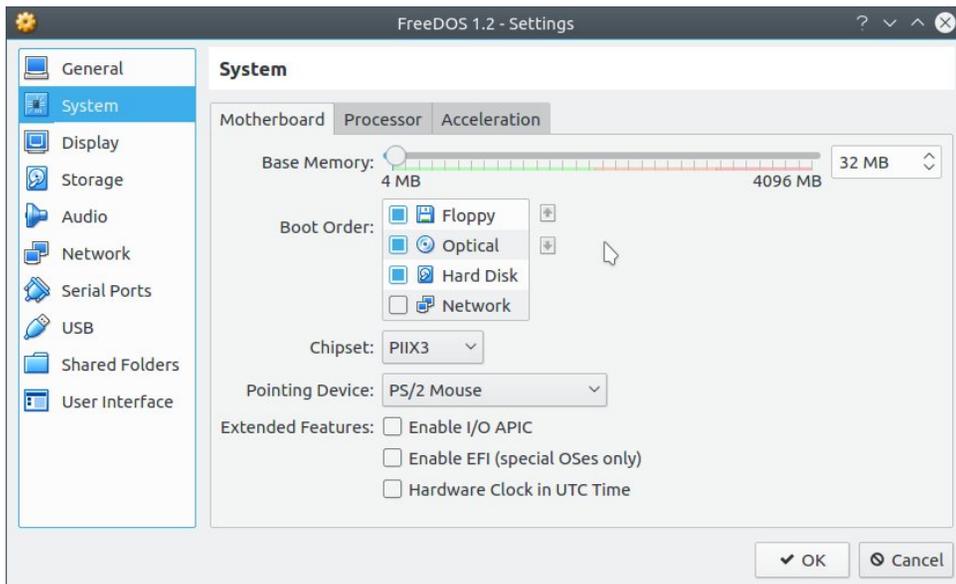
A virtual machine in VirtualBox is initially configured with one floppy drive, one CD/DVD-ROM drive and one hard disk, with the newly created virtual hard disk already installed.

VirtualBox: Going Retro On PCLinuxOS



We need some way to boot the operating system inside VirtualBox.

The **System** tab gives us some basic settings including where VirtualBox should look for a operating system to boot. The default settings here will work fine. By default, the virtual floppy is searched first, followed by a CD/DVD-ROM drive, and finally the virtual hard drive.



VirtualBox supports either a PIIX3 or the ICH9 chipset for peripheral controllers. Though FreeDOS works best with PIIX3 (which is an old-school chipset found in PCs built in the late 1990s), I was able to boot FreeDOS natively on my laptop, which has a ICH8 chipset.

The Dell Dimension 4600 has a ICH5 chipset and can boot FreeDOS as well (of course, getting the USB subsystem to work is another matter).

All other settings here should be left as is.

For the video adapter, a simulated VGA board with VESA 2.0 extensions is installed and is compatible with generic drivers for Trident boards. As for the monitor, it is simulated with a resizable window.

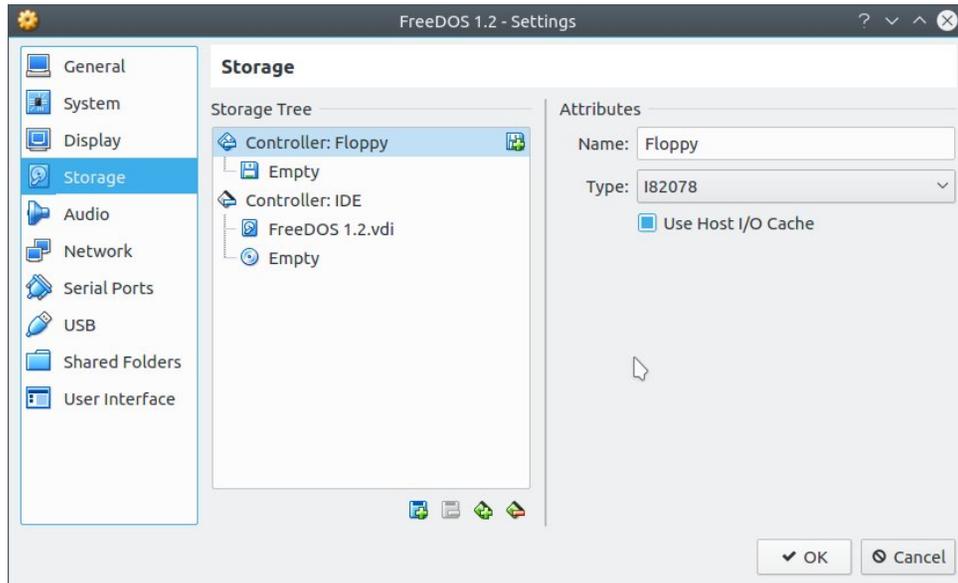
Simulated text is 80 x 25, but can display 132 x 30 (in a widescreen format) or 80 x 30 with generic Trident drivers (tested with Word Perfect and Quattro Pro).



As for audio, VirtualBox emulates a SoundBlaster 16 (a wise choice as that was the most common sound board that could work on most any x86 operating system), a AC97 compliant audio board or Intel HD audio. For FreeDOS, this setting should be left as is.

FreeDOS 1.2 contains drivers for the SoundBlaster 16 as part of its distribution so no separate drivers need to be downloaded.

Let us click on **Storage**.



Here we can see that the virtual hard drive we created is already available, and that there is a single floppy drive and a CD/DVD-ROM drive. These are marked empty as no disk images have been assigned to them. This will change when we start the virtual machine.

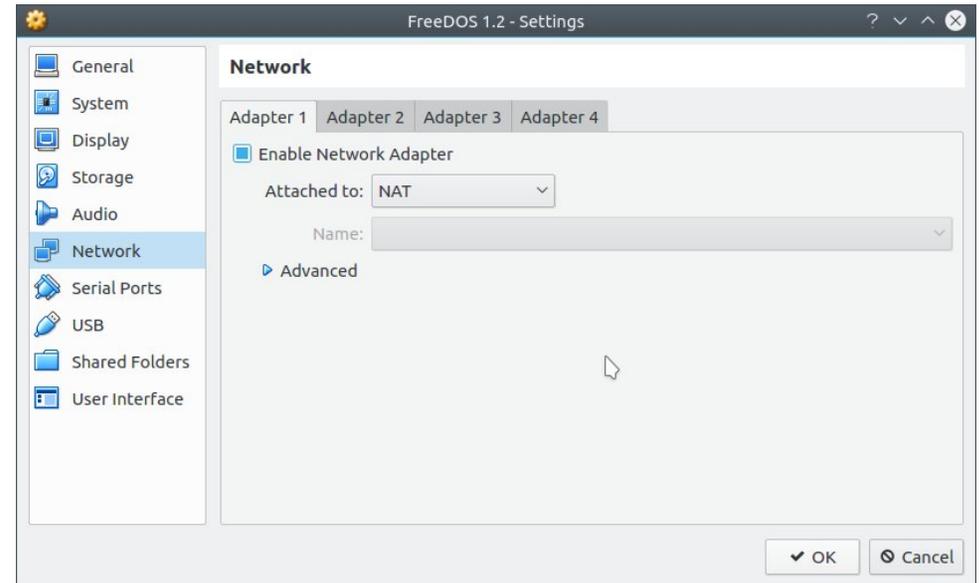
We can add a second floppy drive to the system, and additional IDE or SCSI controllers to the virtual machine. The **Use Host I/O Cache** is enabled to accelerate disk performance from virtual disks.

Note: Any CD-ROM or DVD-ROM images assigned to VirtualBox **must be in iso9660 format**. These files have the **.ISO** extension in their names, for example **FD12INS.ISO** is a DVD image for the FreeDOS 1.2 installation disk.

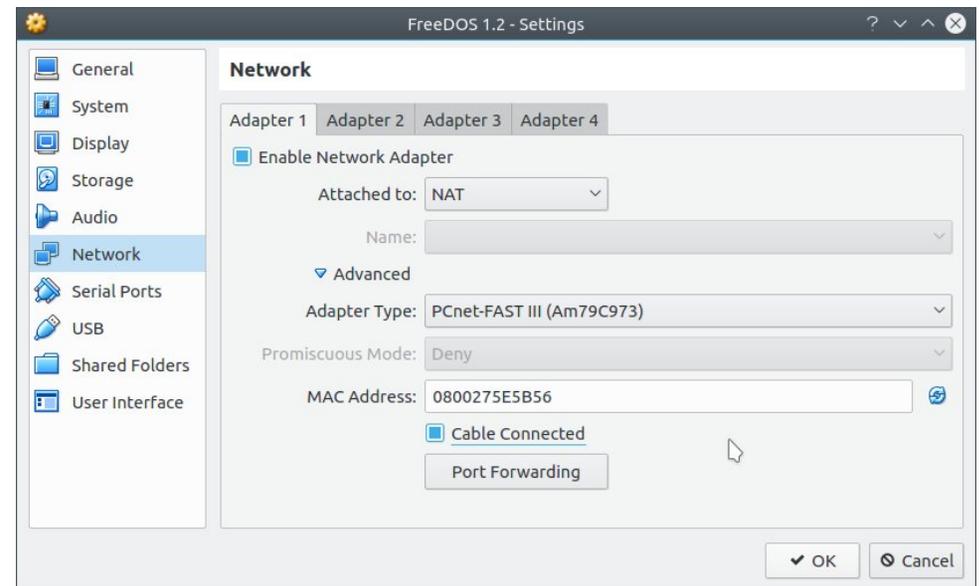
You can assign disks from this menu, but when you run the virtual machine for the first time, VirtualBox will ask for the operating system CD, either as a disk image, or you can tell VirtualBox to look at the CD/DVD drive directly.

FreeDOS 1.2 can be networked within VirtualBox, so let us take a look at the **Network** settings.

By default, VirtualBox has one network adapter enabled, and it is setup for use with VirtualBox's internal network (hence the Network Address Translation setting where it says "Attached To:").



Clicking on **Advanced** gives us a look at what is being emulated.



Now we see that VirtualBox chose for us a AMD PCnet FAST III network board with a AMD 79C973 chipset. You can also choose a AMD PCnet PCI-II with a AMD 79C970 chipset. The PCnet FAST III is much faster (even emulated) than the PCI-II and hence is the default.

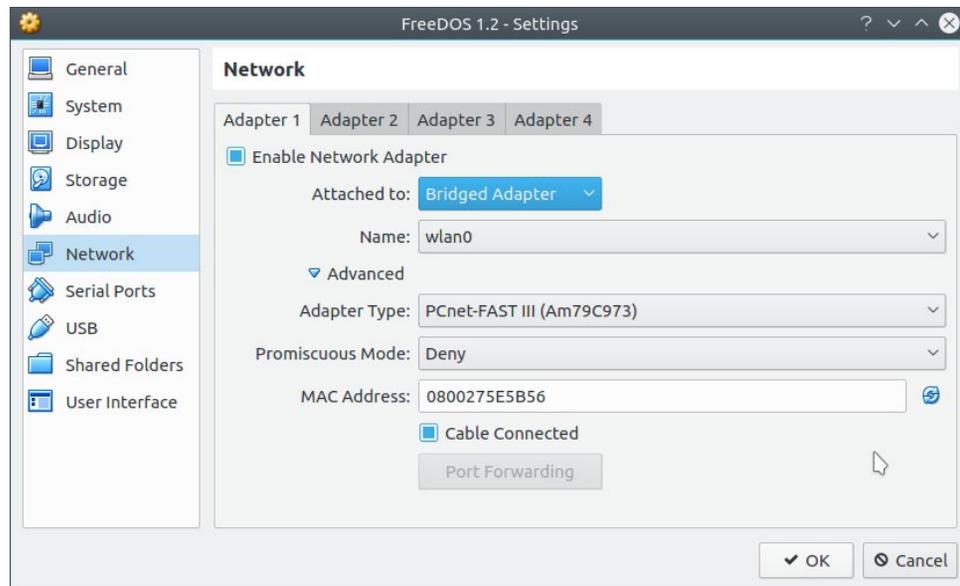
Also, the PCnet Fast III will work with OS/2 Version 4 as well as Windows 9x through XP.

Also emulated are the Intel PRO/1000 MT series adapters (with desktop and server editions) with the 82540EM, 82545CG and 82545EM chipsets.

The MAC address can be changed to anything you want (so long as it is a valid MAC address not used anywhere else in your network).

NAT stands for **Network Address Translation**, and VirtualBox implements an internal network that allows the virtual machine to access the Internet, yet does not allow incoming traffic from the Internet.

For this installation, we want to use **Bridged Adapter** to allow FreeDOS to access the Internet using the same network adapter PCLinuxOS uses to access the Internet.



Here, FreeDOS can access the Wi-Fi on my laptop. To this date, there are no Wi-Fi drivers available for DOS, and hence, this is the only way FreeDOS (or any other DOS for that matter) can access your machine's Wi-Fi connection.

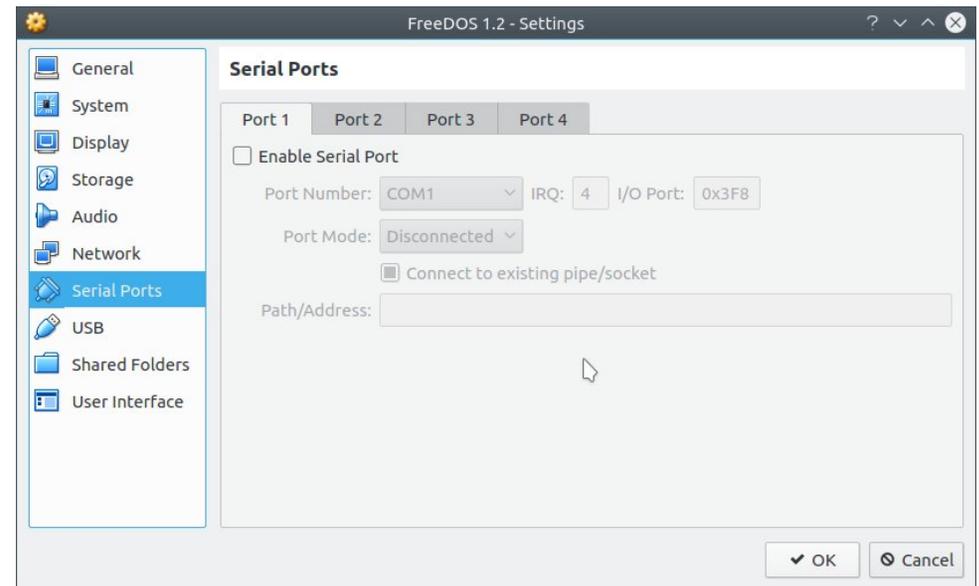
Other settings here **should be left alone**, as they are set for secure access to the Internet.

Also, one important thing is missing in VirtualBox, but there is a way around it.

At some point, we will want to print something from FreeDOS. You can configure and use a network printer from VirtualBox, but what about the locally attached printer.

Searches on the Internet resulted in solutions to this problem, but most of them are geared towards VirtualBox running on Windows, which does not help matters here.

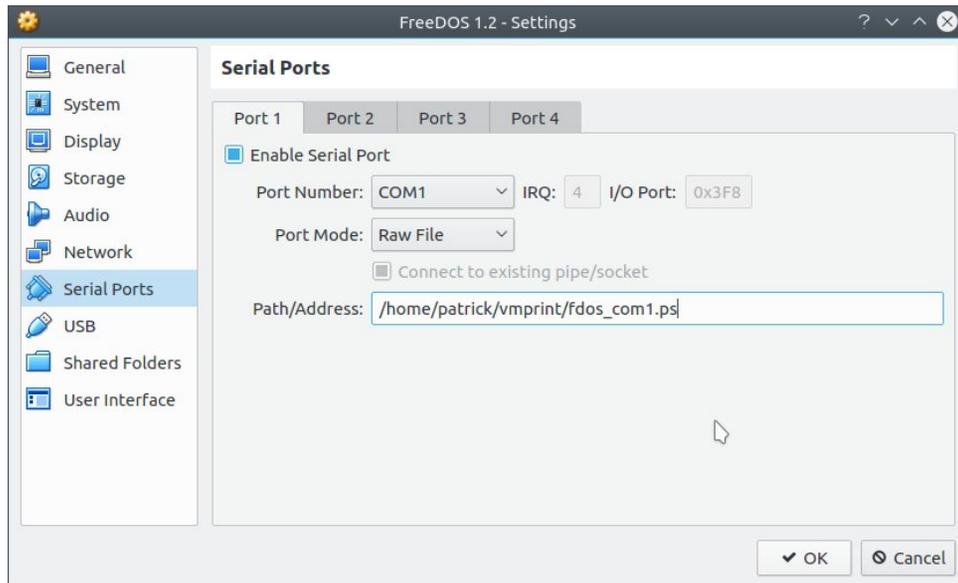
While there are no parallel ports to emulate, there are, however, four emulated serial ports we can use. Let us now click on **Serial Ports**.



By default, **no serial ports** are enabled. The first thing we need to do here is enable a serial port, so why not enable the first serial port by clicking on **Enable Serial Port**.

Here we can emulate the serial port for printers by writing the printer output to a file. In this example, I have created a pseudo print spooler in a directory called vmprint and have VirtualBox write printer output to a file called **fdos_com1.ps**.

To do this, select **Raw File** from Port Mode and enter the full pathname of the output file we are going to use to emulate the FreeDOS printer.



If you have a real serial port (or a Serial to USB adapter) you can select **Host Device**, then enter the device name in the **Path/Address** field, such as `/dev/ttyUSB0` (for a Serial to USB adapter) or `/dev/ttyS0` (for a real serial port).

There are other modes you can use for Port Mode, but that is a topic beyond the scope of this article.

Raw File mode is very useful here. When writing printer output to a file, you get a chance to see what the printer output will look like before you actually print the file.

I used the **.PS** extension for the output file as we will later need to configure DOS applications to output PostScript code, which we will then use **lpr** in PCLinuxOS to print the files.

As a bonus, we can also use **ps2pdf** to create PDF files from the DOS output.

The use of serial ports for printer output goes back to the days when printers were directly connected to mainframe computers, which only had serial ports for communication. Apple LaserWriter emulation is recommended as that printer understood PostScript and connected to a serial port.

When we are finished, click on **OK**.

We are now ready to start the virtual machine.

Start the Virtual Machine

Click on **Start** in the main menu. As this is the first time we launched the virtual machine, you will be prompted for the operating system CD/DVD.



If you burned **FD12INS.ISO** to a DVD, please insert that DVD into your system's DVD drive (if you have not already done so).

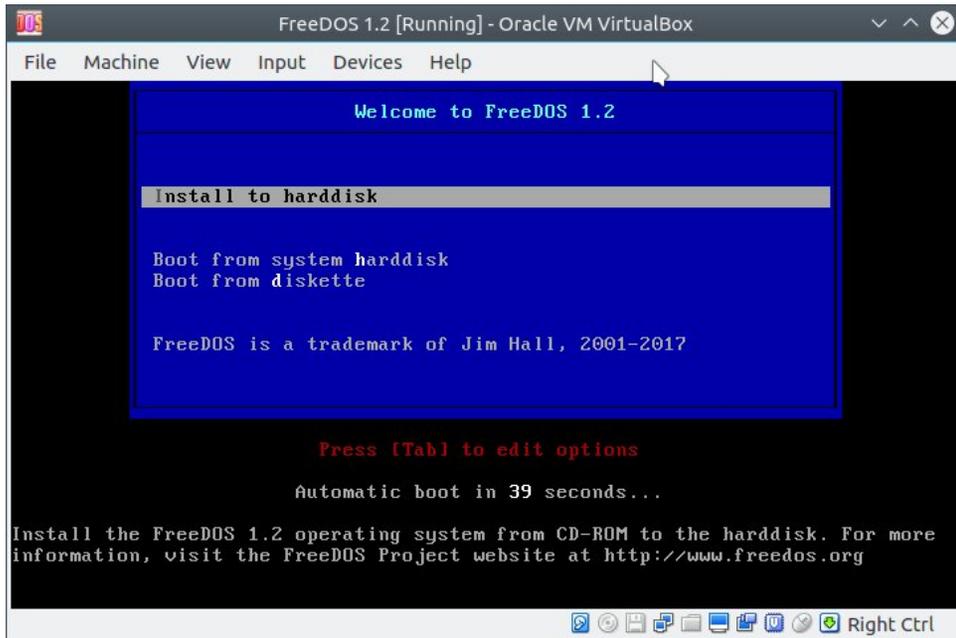
Otherwise, click on the folder icon inside this dialog and select **FD12INS.ISO** from the directory where you have downloaded the FreeDOS 1.2 installation DVD.

Click on **Start** to begin installation.

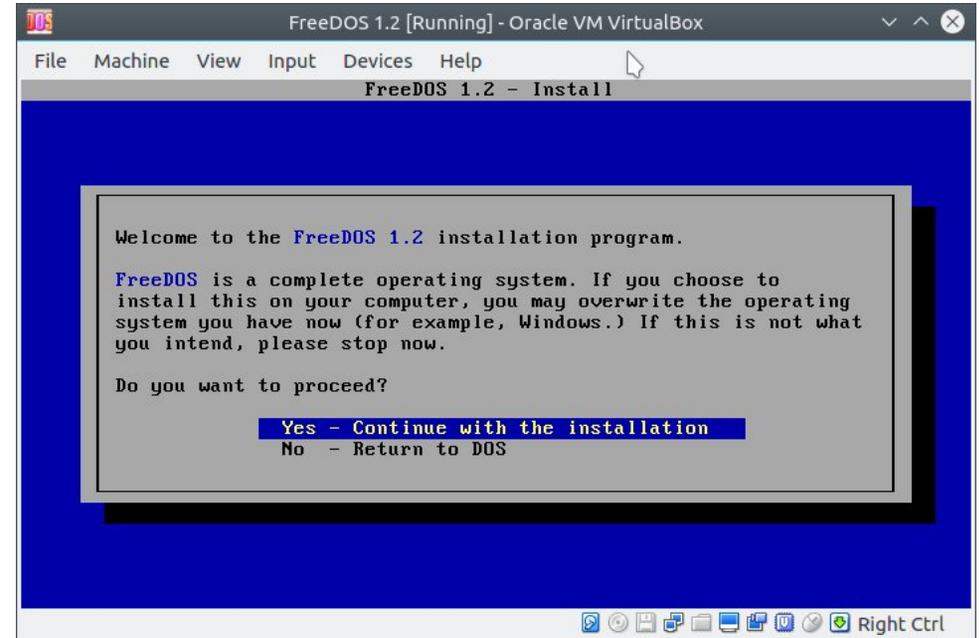
I wrote an article regarding FreeDOS back in 2012. That article was for installing FreeDOS 1.0 on QEMU. As we can see, FreeDOS 1.2 is vastly different from FreeDOS 1.0 in terms of the installation procedure. Yet, FreeDOS 1.2 is still a DOS. Also, QEMU has not been in the PCLinuxOS repository for a long time.

VirtualBox: Going Retro On PCLinuxOS

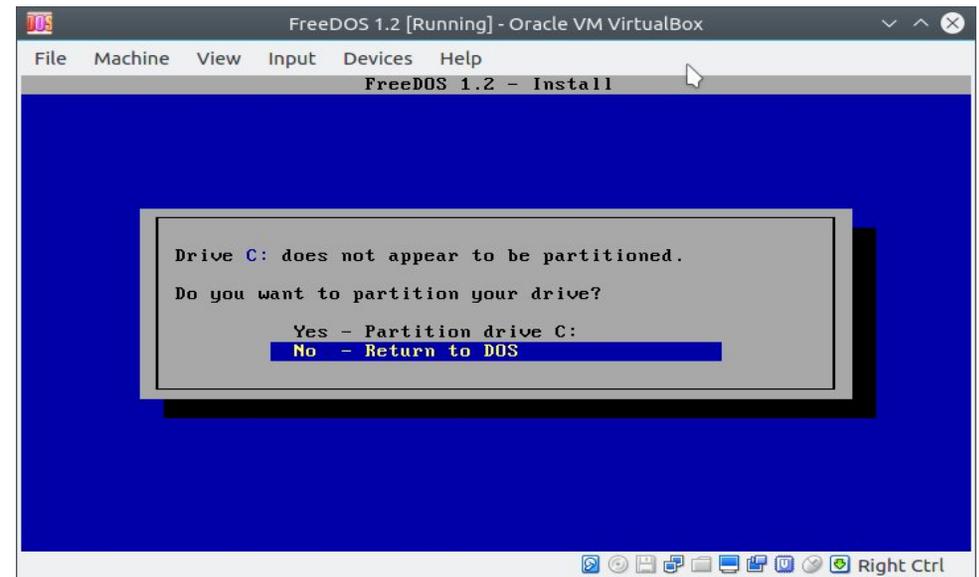
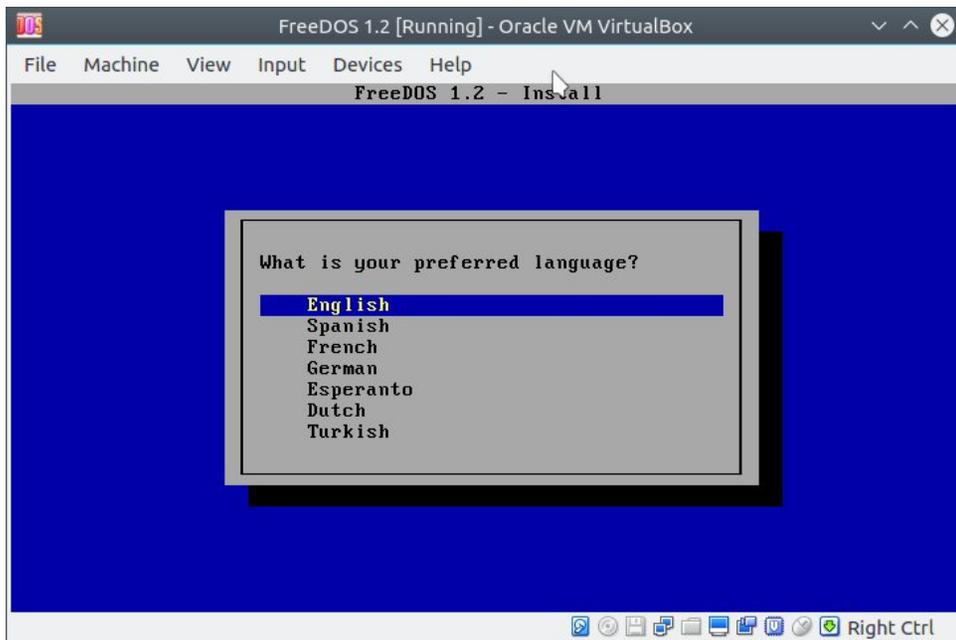
Many of these instructions displayed here are self explanatory. It is safe to choose the defaults for these questions. Press **Enter** to move to the next step.



All you need to do here is press **Enter** to start the installation of FreeDOS to your virtual hard drive.



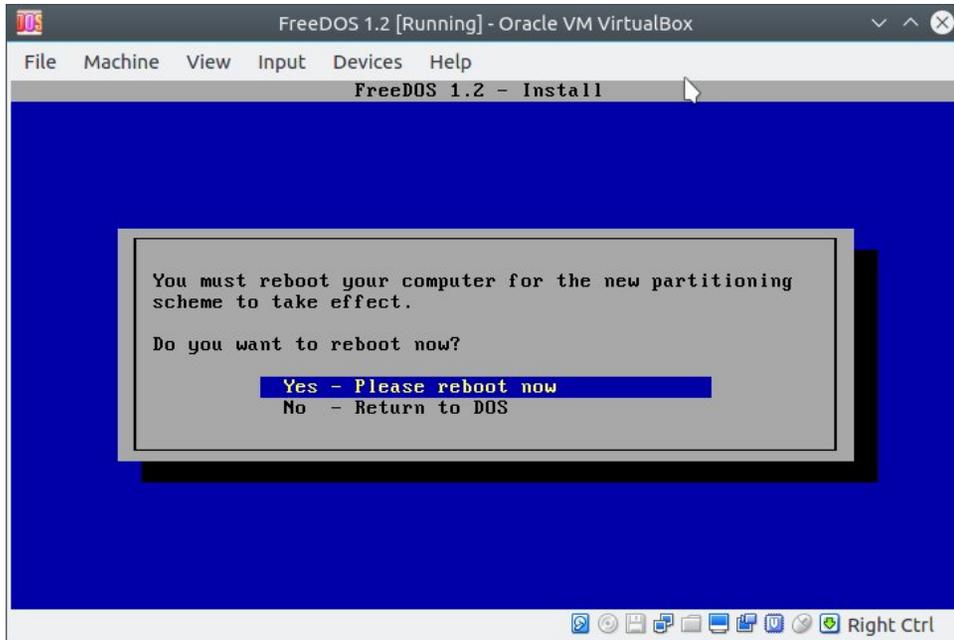
Here the developers of FreeDOS remind us that their product will replace the operating system on the hard drive where FreeDOS is to be installed. As we are installing FreeDOS on this virtual hard drive, we can say Yes to this question.



As with any new hard drive, the virtual hard drive we created has to be partitioned.

For FreeDOS 1.2 (or any other DOS for that matter), we need to create a partition for installation. FreeDOS will automatically create the largest available partition for installation.

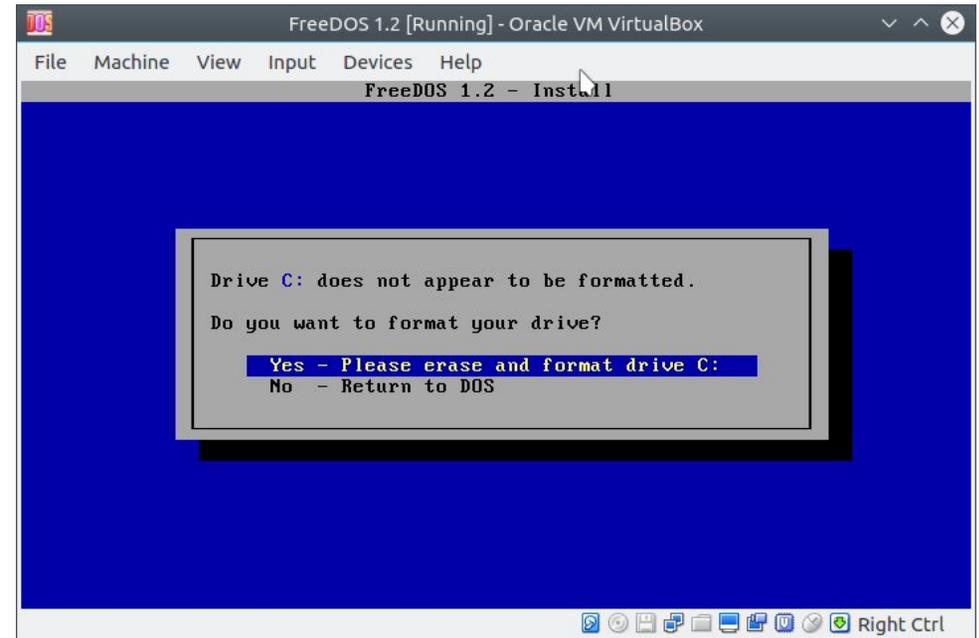
In this case, the entire virtual hard drive will be given one FAT32 partition (as that is what FreeDOS uses). Select **Yes** here and press **Enter** to continue.



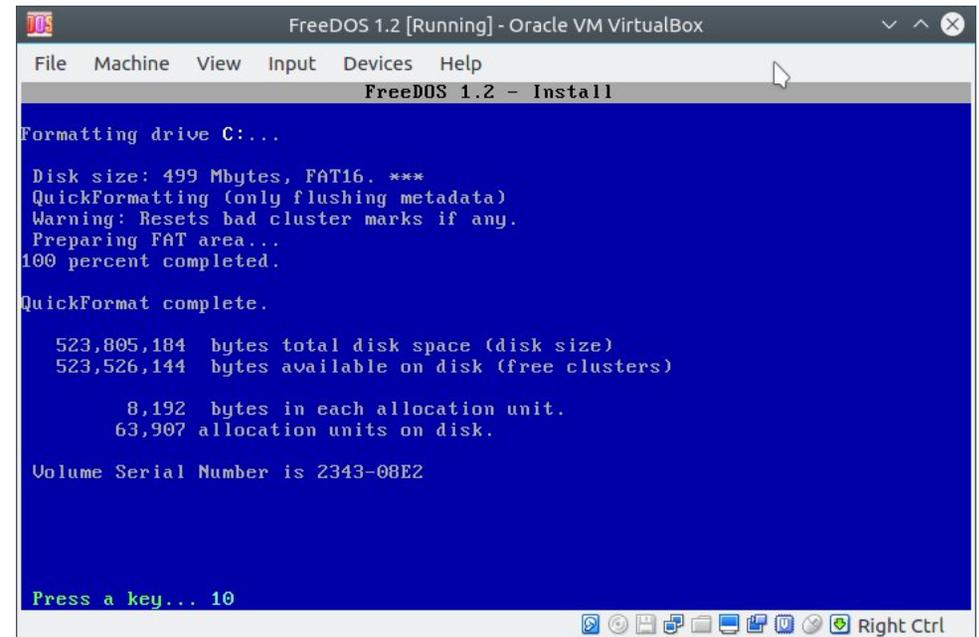
As with any operating system (including PCLinuxOS), changes in the partitioning of the hard disk, whether virtual or physical, require a system reboot for these changes to be recognized by the operating system.

Press **Enter** to reboot the virtual machine. We then return to the main installation menu for FreeDOS.

Press **Enter** again to continue the installation.

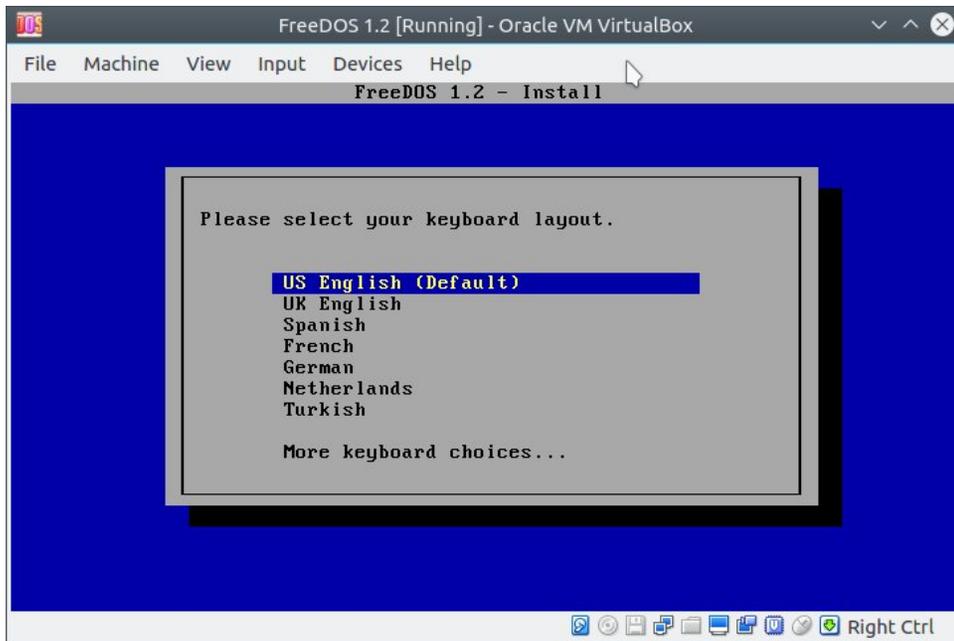


We have only partitioned the virtual hard disk. Now, it needs to be formatted for FreeDOS installation. Press Enter again to format the virtual hard drive so FreeDOS can install in that virtual hard disk.

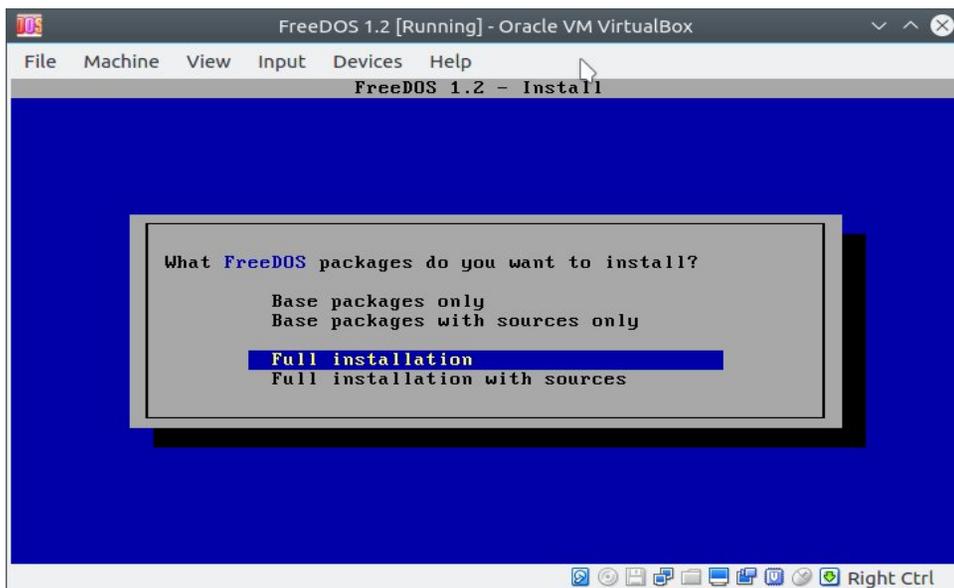


VirtualBox: Going Retro On PCLinuxOS

In this example, we have created a 500MB virtual hard drive, and that hard drive was formatted for FAT16. Had we created a virtual hard drive greater than 2GB, the virtual hard drive would have been formatted for FAT32.



Most of us will press **Enter** here to accept the default keyboard layout.



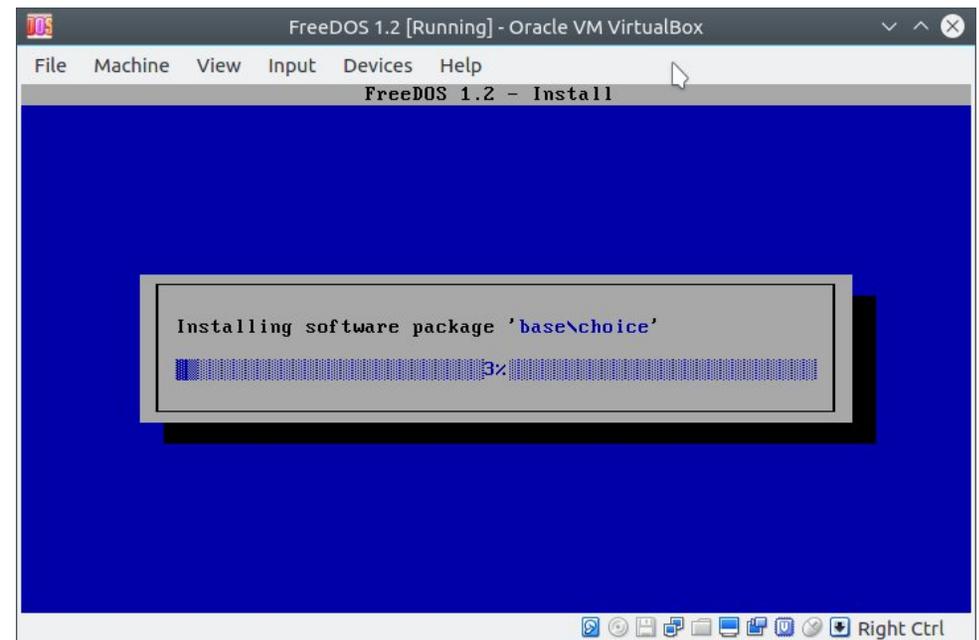
Here, I recommend accepting the default choice as **Full Installation** includes packages from the UTILS directory on the FreeDOS installation disk most DOS users will want and use.

Full Installation is not really the entire distribution. FreeDOS will install what is necessary to get a installation similar to what you get from a PC-DOS 6.3 (or MS-DOS 6.22) installation.

The FreeDOS 1.2 installation DVD contains a few DOS games, multimedia applications and utilities, networking utilities, three graphical desktops, and a suite of development tools.

Simply press **Return** to install the BASE packages and some packages from the UTILS directory.

The sources are completely optional but are offered to comply with the GNU General Public License, of which many components of PCLinuxOS itself are distributed.



...and now we wait for the installation to finish.

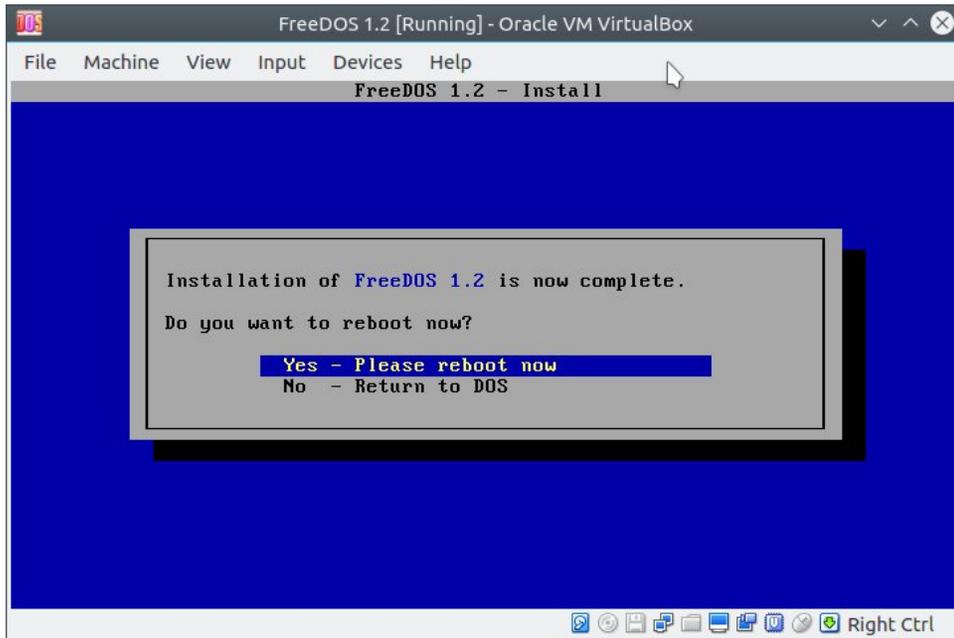
VirtualBox: Going Retro On PCLinuxOS

From the FreeDOS main installation menu, we will now need to tell FreeDOS to boot from the virtual hard disk instead of the DVD. Press the **Down Arrow** key to select *Boot from System Hard Disk* and press **Enter**.

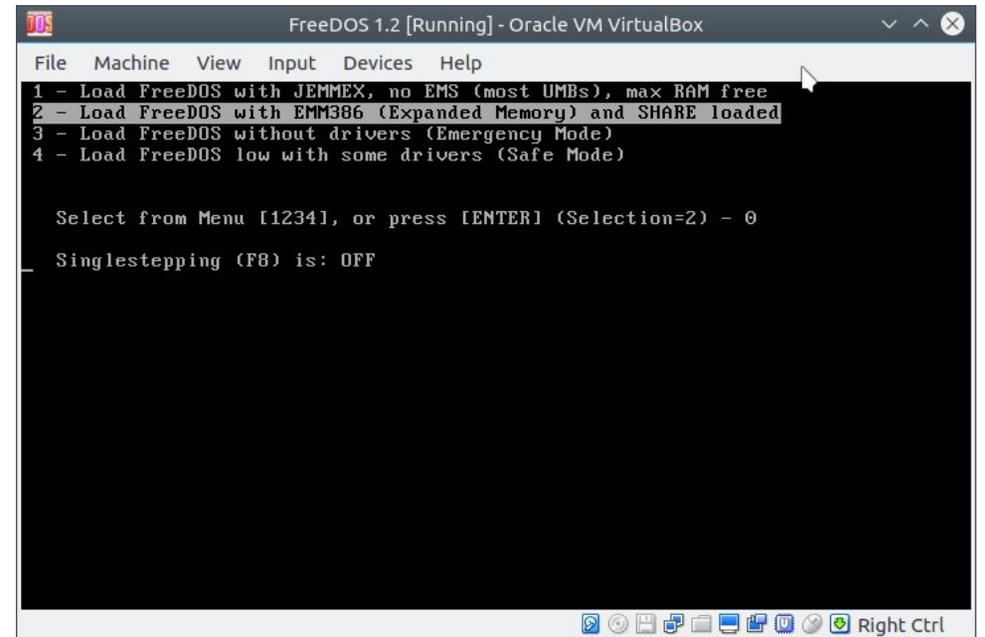
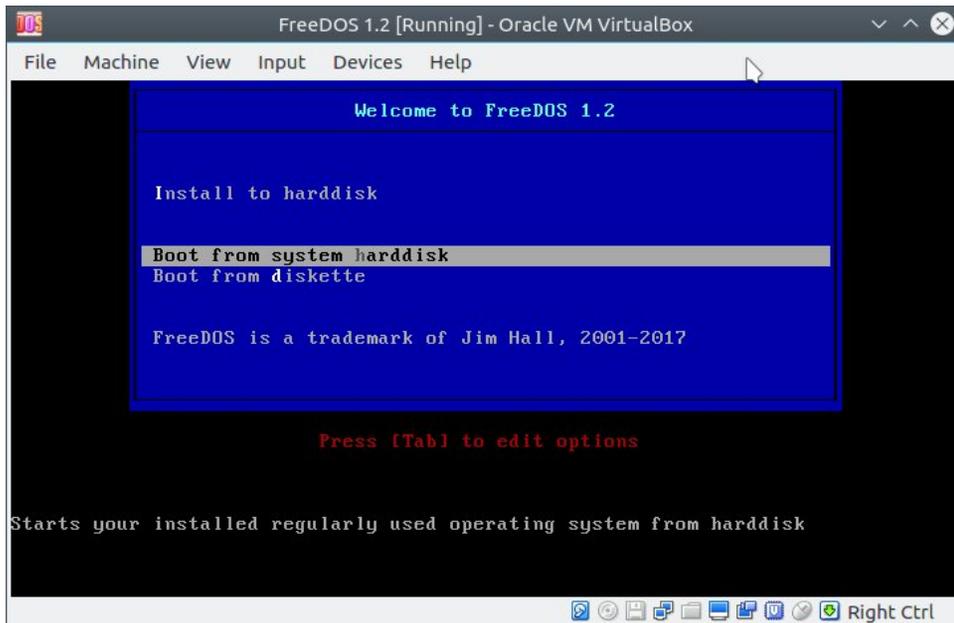
VirtualBox may display a message in a popup that says the mouse pointer is not seamlessly integrated. You may clear that popup.

When you click inside a virtual machine in VirtualBox, the mouse pointer is captured and used by the virtual machine. Hence, the mouse pointer cannot be used for other applications until the mouse pointer is released.

To release the mouse pointer, press the **Control** key on the Right (as opposed to Left) side of the keyboard. The mouse pointer then can be used for other applications running on PCLinuxOS.

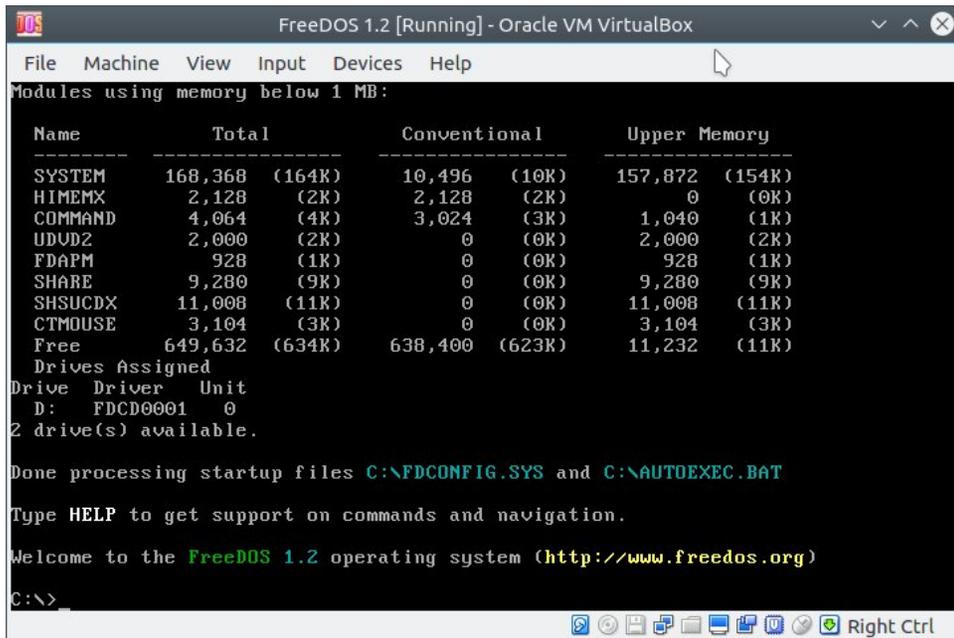


...and once finished, we will need to restart the virtual machine. You will need to leave the FreeDOS 1.2 disk in the DVD drive as we will need it for the next steps.



The default here should be used for maximum benefit of FreeDOS. Press **Enter** (or the number 2) to continue.





...and if everything installed as planned, you should see this. We are now in FreeDOS.

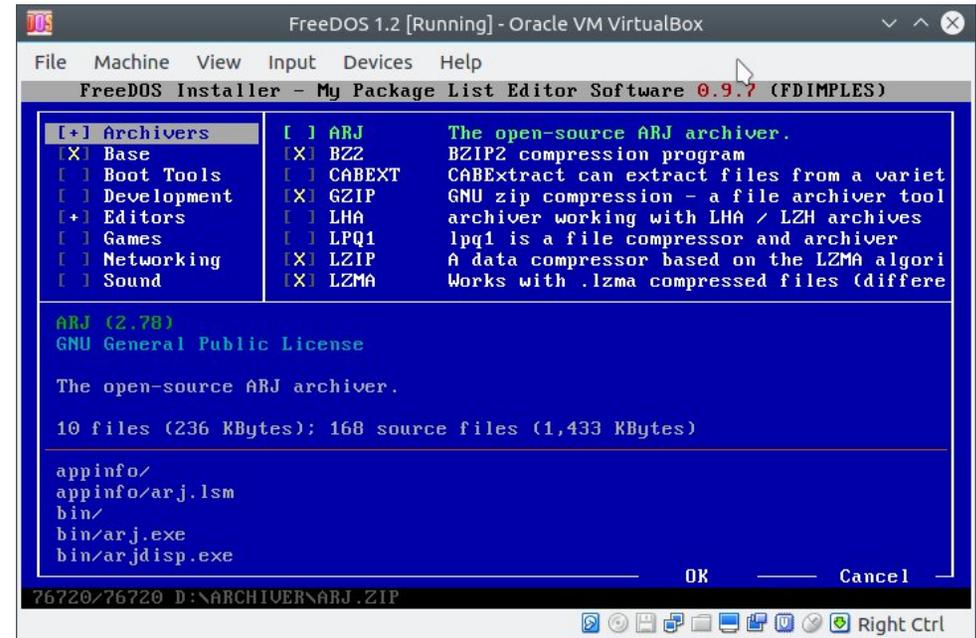
Configuring and Networking FreeDOS

This was just the basic installation of FreeDOS. Now we want to be able to do many of the same things here as we do in PCLinuxOS.

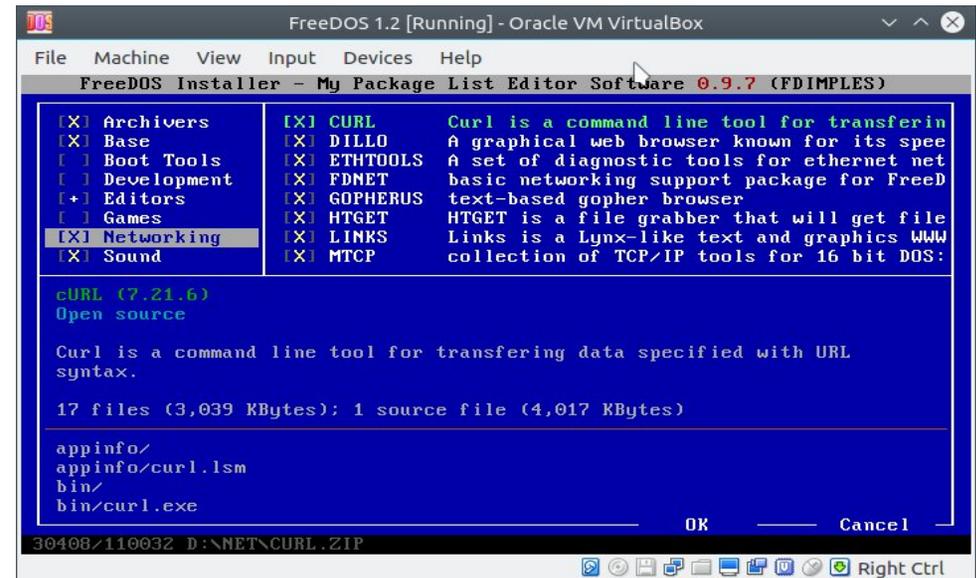
FreeDOS 1.2 now comes with a utility called **fdimples**. Here is where you need to have the FreeDOS installation DVD available. We will need this utility to install networking as well as other applications, games and other useful programs already on the installation DVD.

If the FreeDOS installation DVD is not in the DVD drive, **fdimples** will only show you what has been installed.

Simply type **fdimples** to launch the utility.



You can select entire categories of applications or you can choose individual packages, not unlike some old school Linux distributions. Press **Tab** to switch between panels. Press **Space** to select and/or deselect items. When finished, press **Tab** until the **OK** is highlighted, then press **Enter** to install all selected items from the installation DVD.



For this example, I have the Sound, Networking and Archivers categories selected. Everything from these categories will be installed from the installation DVD with **fdimples**.

We should have at least the Networking packages installed as we will be configuring FreeDOS to use the Internet. Installing the Networking packages will provide the networking capability to FreeDOS.

Once the networking packages are installed, we will need to reboot FreeDOS to get things working.

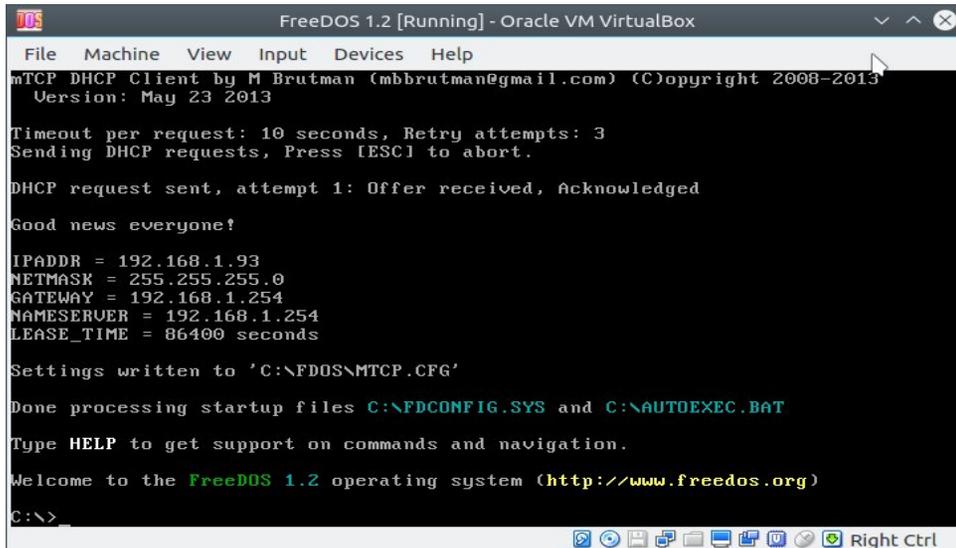
Up to now, the FreeDOS installation took care of the rebooting process inside VirtualBox. This time, the reboot is not automatic.

To reboot VirtualBox, instead of the three finger salute (that is, pressing Control-Alt-Delete), we hold down the **right side Control** key, then press **R**.

*Note: The right side Control key is not the same as the left side Control key on the keyboard. The main difference is the location of the keys on the physical keyboard. If you have clicked the mouse pointer inside the FreeDOS window, you will need to release the mouse pointer to PCLinuxOS by pressing the right side Control key. In VirtualBox, this is known as the **Host** key.*

Alternately, we can select **Machine** → **Restart** from the VirtualBox menu.

What is different with this reboot? Since the networking packages were installed, FreeDOS automatically connected to the Internet as it has its own IP address.



```
FreeDOS 1.2 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
mTCP DHCP Client by M Brutman (mbrutman@gmail.com) (C)opyright 2008-2013
Version: May 23 2013

Timeout per request: 10 seconds, Retry attempts: 3
Sending DHCP requests, Press [ESC] to abort.

DHCP request sent, attempt 1: Offer received, Acknowledged

Good news everyone!

IPADDR = 192.168.1.93
NETMASK = 255.255.255.0
GATEWAY = 192.168.1.254
NAMESEVER = 192.168.1.254
LEASE_TIME = 86400 seconds

Settings written to 'C:\FDOS\MTCP.CFG'

Done processing startup files C:\FDCONFIG.SYS and C:\AUTDEXEC.BAT

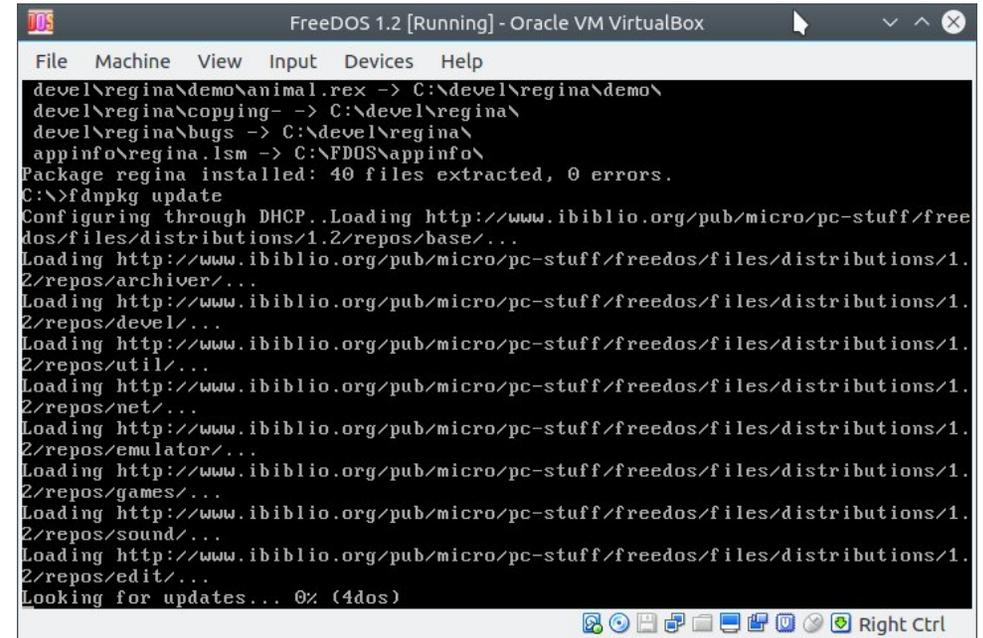
Type HELP to get support on commands and navigation.

Welcome to the FreeDOS 1.2 operating system (http://www.freedos.org)

C:\>
```

This is the result of configuring the virtual machine to use the Bridged Adapter. Now, FreeDOS is sharing the network connection with PCLinuxOS.

While **fdimples** only installs packages from the installation DVD, there is a second utility that installs and updates packages from the FreeDOS repository located at ibiblio.org.



```
FreeDOS 1.2 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
devel\regina\demo\animal.rex -> C:\devel\regina\demo\
devel\regina\copying- -> C:\devel\regina\
devel\regina\bugs -> C:\devel\regina\
appinfo\regina.lsm -> C:\FDOS\appinfo\
Package regina installed: 40 files extracted, 0 errors.
C:\>fdnpgk update
Configuring through DHCP..Loading http://www.ibiblio.org/pub/micro/pc-stuff/free
dos/files/distributions/1.2/repos/base/...
Loading http://www.ibiblio.org/pub/micro/pc-stuff/freedos/files/distributions/1.
2/repos/archiver/...
Loading http://www.ibiblio.org/pub/micro/pc-stuff/freedos/files/distributions/1.
2/repos/devel/...
Loading http://www.ibiblio.org/pub/micro/pc-stuff/freedos/files/distributions/1.
2/repos/util/...
Loading http://www.ibiblio.org/pub/micro/pc-stuff/freedos/files/distributions/1.
2/repos/net/...
Loading http://www.ibiblio.org/pub/micro/pc-stuff/freedos/files/distributions/1.
2/repos/emulator/...
Loading http://www.ibiblio.org/pub/micro/pc-stuff/freedos/files/distributions/1.
2/repos/games/...
Loading http://www.ibiblio.org/pub/micro/pc-stuff/freedos/files/distributions/1.
2/repos/sound/...
Loading http://www.ibiblio.org/pub/micro/pc-stuff/freedos/files/distributions/1.
2/repos/edit/...
Looking for updates... 0% (4dos)
```

The **fdnpgk** utility is the package manager that comes with FreeDOS.

When we installed PCLinuxOS, one of the first things we did was to do an initial update of the installation. We used Synaptic for that.

FreeDOS is no different in that regard. Type **fdnpgk update** to do the same thing after all packages are installed. This checks for package updates and installs these updates when necessary.

We're Done

...and that's it. We now have FreeDOS installed and working on VirtualBox.

The FreeDOS repository can be found at:

<http://www.ibiblio.org/pub/micro/pc-stuff/freedos/files/distributions/>

for all versions of FreeDOS.

<http://www.ibiblio.org/pub/micro/pc-stuff/freedos/files/distributions/1.2/>

For FreeDOS 1.2. The FreeDOS installation DVD was created from this repository, and updates are indicated by the presence of subdirectories within this repository.

The software available in the FreeDOS repository is only a sample of what can be run under FreeDOS. In the next few issues, I will present things that can be done with FreeDOS running under PCLinuxOS.

Actually, this is the best (and safest) way to run FreeDOS on PCLinuxOS.

Application Notes for FreeDOS

FreeDOS has a definitive layout in which applications that are installed from the repository and from the installation DVD. Those of you familiar with the various DOS implementations will notice the difference.

For example, the DJGPP Development System is installed in `C:\DEVEL\DJGPP` where normally, DOS users install the same software in `C:\DJGPP`.

However, this will not stop us from installing CD-based applications such as the Word Perfect 6.2 suite. We can install DOS applications in FreeDOS the same way we always did. This particular application will install in FreeDOS 1.2 the same way it installs in PC-DOS 6.3 (or MS-DOS 6.22).

There is, however, one notable exception: The Geoworks productivity suite.

Geoworks will install and run in any other DOS (as well as OS/2 and Windows NT versions 3.5 through XP), but it **will not run in any version of FreeDOS!**

This is because this productivity suite was written in assembly language and used undocumented functions of DOS, which of course will never be available in FreeDOS.

To run Geoworks in VirtualBox, you will need to install a separate version of DOS such as PC-DOS 5.0. (I chose this example as this was the particular version of DOS that Geoworks was designed to run under. Thankfully, I have a physical copy of PC-DOS 5.02 that I pulled out of storage. GeoWorks will run under MS-DOS 6.22, PC-DOS 6.3 and 7.0 as well.)

The same could be said for Windows 3.1, however, you will need to type `WIN /S` to run Windows 3.1 in FreeDOS (not that anyone should install Windows 3.1 in FreeDOS to begin with as there are three other graphical interfaces available on the FreeDOS installation DVD).

Let the Retro Computing Begin

With this setup, we have now entered the world of retro computing. FreeDOS 1.2 provides a way to run most of your old DOS software that has not been used in a while.

There are some other issues that need to be discussed about DOS software, such as how to get those floppy based applications into VirtualBox, but that will be for another issue.

To shutdown the virtual machine, simply close the window. You will be prompted to either save the state of the machine, or to do a virtual shutdown (ACPI style) of the machine. For FreeDOS, the latter will be sufficient as we normally have done that with real DOS machines.

Enjoy the nostalgic trip.



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Screenshot Showcase



Posted by OnlyHuman, May 5, 2017, running e21.

Tip Top Tips: HDMI Sound On

Editor's Note: Tip Top Tips is a monthly column in The PCLinuxOS Magazine. Each month, we will feature – and possibly even expand upon – one tip from the PCLinuxOS forum. The magazine will not accept independent tip submissions specifically intended for inclusion in the Tip Top Tips column. Rather, if you have a tip, share it in the PCLinuxOS forum's "Tips & Tricks" section. Your tip just may be selected for publication in The PCLinuxOS Magazine.

This month's tip comes from PCLinuxOS forum member **Phil**.

I plugged my traveling machine into a telly in Portugal with an HBDI cable, and had no sound.

The solution is to configure your sound to use HDMI output.

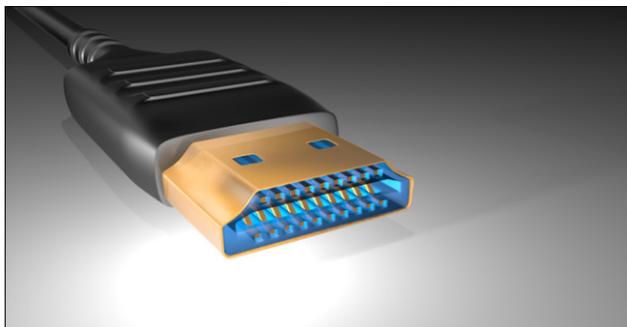
My mini machine has Pulse Audio in.

From the Mate application menu Sound > Sound. (This does not show in KDE or LXDE desktop application launcher options).

In the Hardware tab select HDMI

Sound now works.

Making lots of noise now.



Additional Information

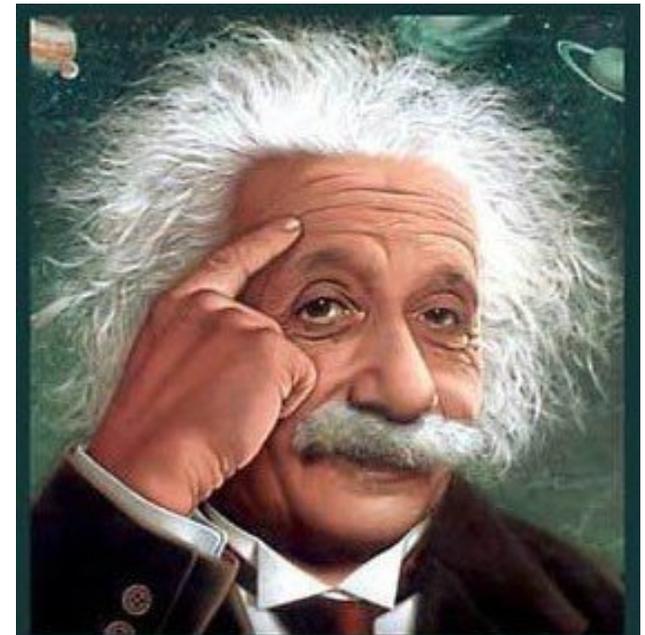
In KDE Menu - Sound - PulseAudio Volume Control - Configuration tab, set the output to HDMI. This is confirmed by i14.

Sound - PulseAudio Volume Control for all desktops. Select the far right tab, Configuration, and change the Profile to HDMI. (And change back later of course).

Also, if the HDMI video does not work, switch to a virtual terminal, and then back. This seems to do the trick. For example, Ctrl+Alt+F2 and then back to your desktop, via Ctrl+Alt+F8.

You can also try killing the xserver with CTRL+Alt+Backspace+Backspace. This seems to force HDMI to work.

You just need to pack an HDMI cable now.



It's easier than $E=mc^2$
It's elemental
It's light years ahead
It's a wise choice
It's Radically Simple
It's ...



Game Zone: Sunless Sea

by Stephen Morrish (PendragonUK)



Introduction

Take the helm of your steamship and set sail for the unknown! Sunless Sea is a game of discovery, loneliness and frequent death, set in the Victorian Gothic universe of Fallen London.

Features

- A deep, compelling world packed with 350,000+ words of stories and secrets. Find your father's bones. Determine London's destiny. Defy the gods of the deep sea.
- Beautiful, hand drawn art - castles of sparkling ice, prisons perched on lily pads, fog-shrouded lighthouses and the DAWN MACHINE.
- Your captain will die. But you can pass on resources from one generation to the next. Acquire a family home and a hoard of heirlooms. Build up your own story across generations of sailors who braved the sea and lost - or won...

- Real-time combat against ships and Zee-beasts, spider-crowed dreadnoughts and sentient icebergs.
- Light and dark, terror and madness: stray too far from the gas-lamps of civilisation and your crew will grow fearful and eventually lose their sanity.
- Upgrade your steamship with powerful engines, cannons and pneumatic torpedo guns. (Or buy a bigger, better ship.)
- Hire unique officers like the Haunted Doctor and the Irrepressible Cannoneer. Each has a story to tell, if you can draw it out of them.
- Choose a ship's mascot: the Comatose Ferret, the Wretched Mog, the Elegiac Cockatoo, and more!
- Trade or smuggle silk and souls, mushroom wine and hallucinogenic honey.



Who Makes It

Failbetter Games is a British video game and interactive fiction studio founded in January 2010.

They are chiefly known for its Fallen London Victorian Gothic franchise which has garnered a cult following.

About the Game

Sunless Sea is a survival/exploration role playing video game with roguelike elements. Taking place in "Fallen London", in which Victorian era London has been moved beneath the earth's surface to the edge of the "Unterzee", a vast underground ocean.

The player takes on the role of an "Unterzee" steamship captain, the background and ambitions of whom are customisable. The player can win by achieving their chosen ambition, such as becoming Fallen London's most celebrated explorer or amassing enough wealth to retire. Resources to achieve these ends are acquired by discovering new locations, trading goods across the "Unterzee", battling ships and "zee monsters", and completing story quests. There are several roguelike gameplay elements, such as partially randomised maps and permanent character death, but subsequent characters can inherit some of their predecessor's possessions, and a player may create a will to insure lodging and wealth for their successors.



Conclusion

A haunting exploration game with great music, a really unique setting, and lots of replayability. If you like dark works, macabre themes, great stories, and don't mind a lot of reading, give it a go.

System requirements

MINIMUM:
 Processor: 2Ghz or better
 Memory: 2 GB RAM
 Graphics: 1280 x 768 minimum resolution, DirectX 9.0c compatible graphics card, OpenGL Core
 Sound Card: DirectX 9.0c compatible

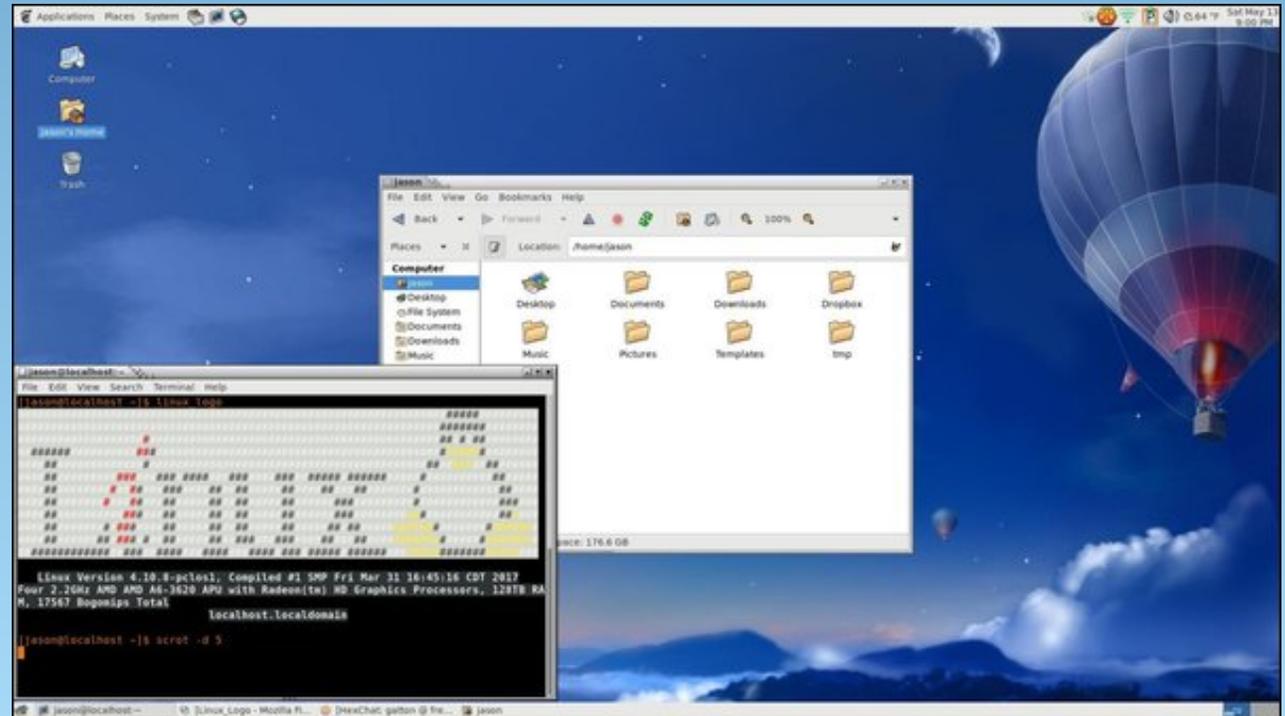
Where to get it

Steam <http://store.steampowered.com/app/304650/>
 Price \$18.99 USD / £13.99 GBP
 Humble Store
<https://www.humblebundle.com/store/sunless-sea>
 DRM Free download \$18.99 USD / £15.49 GBP

More resources for the game can be found at the excellent Wiki
http://sunlesssea.gamepedia.com/Official_Sunless_Sea_Wiki



Screenshot Showcase



Posted by gattion, May 13, 2017, running Mate.

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PCLinuxOS Family Member Spotlight: arjaybe

As told to YouCanToo



What is your name/username?

My name is Jim Bowering, username arjaybe.



How old are you?

I'm 67 years old.

Are you married, single?

I've been married for 41 years to Carolyn (center, top).

How about Kids, Grandkids (names and ages)?

I have one son, Kevin, 31 years old, and one granddaughter, Sanura, 1 year old.



Do you have pets, what is your favorite?

No more pets. Too much chance that they'll outlive me.

Are you retired, still working and if working, what do you do?

I'm retired from gainful employment. Now I concentrate on writing books.

Where do you call home? What is it like? IE: weather, scenery

I live in the southern Okanagan Valley, British Columbia, Canada. It's known as a pocket desert, featuring lakes and mountains. (see photos at right) With irrigation, the agriculture is predominantly orchards and vineyards.

Where did you go to school and what is your education level?

I graduated from the local high school and completed only one year of college. I did mostly short training for specific occupations - weather, air traffic, vessel traffic.



What kind of things you like doing? hobbies, travel, fishing, camping?

I like writing, maintaining my website, and keeping current with scientific knowledge. In season, I like to ride my motorcycle (photo next page).



Why and when did you start using Linux?

I first tried Linux in 1999, and switched to it full-time in 2001. I was using OS/2 since 1991, and it was failing to keep up.

What specific equipment do you currently use with PCLOS?

I'm currently running a Zotac small form factor computer. I like that it's small, quiet and energy efficient.

What would you like to see happen within PCLOS that would make it a better place. What are your feelings?

I think PCLinuxOS is doing fine. It's a good OS with a good community and forum. Not to mention the magazine.

PCLinuxOS Family Member Spotlight is an exclusive, monthly column by YouCanToo, featuring a PCLinuxOS forum member. This column will allow "the rest of us" to get to know our forum family members better, and will give those featured an opportunity to share their PCLinuxOS story with the rest of the world.

If you would like to be featured in PCLinuxOS Family Member Spotlight, please send a private message to youcantoo, parnote or Meemaw in the PCLinuxOS forum expressing your interest.



The PCLinuxOS Magazine

Created with Scribus



Screenshot Showcase



Posted by tgency, May 8, 2017, running e21.



Encrypt VirtualBox Virtual Machines

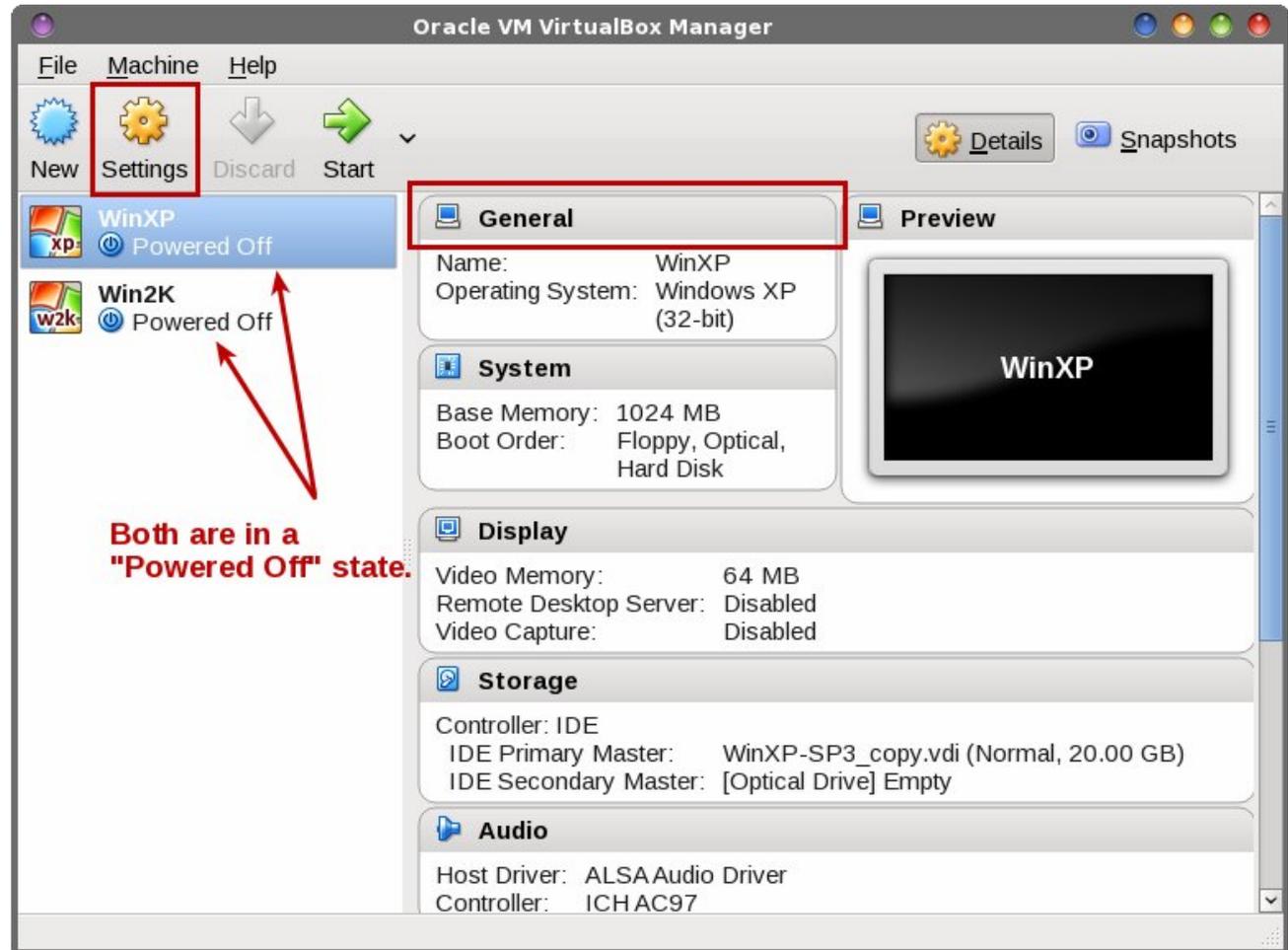
by Paul Arnote (parnote)

One of the newer features in VirtualBox (starting with version 5.x) adds the ability to encrypt your the virtual hard drives of your virtual machines. In today's computing environment, where your privacy is always under attack from all sides, you may find it necessary to apply encryption to your VirtualBox VMs.

Don't be so quick to dismiss the need for encryption. For example, here in the U.S., many of us use (and buy) income tax software every year to fill out and submit our income taxes. Contained within those files are some VERY sensitive and private data that could lead to devastating ruination should it ever fall into the wrong hands.

Unfortunately, unless you use online services to fill out and submit your income taxes (which have a whole other set of security issues), all of the tax software runs either on Windows, OS-X, iOS or Android. There is nothing that will run natively on Linux. As such, the omission of tax software that runs natively under Linux pushes Linux users to often run their chosen tax software in a virtual machine, usually VirtualBox.

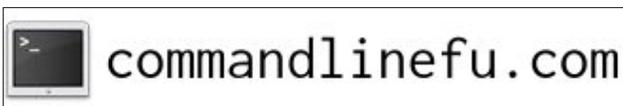
That is but one example of private, personal, sensitive data that you don't want falling into unscrupulous hands. I'm sure that you can think of other sensitive data pools that are relevant to your use. Being able to encrypt your VirtualBox VMs will help insure that your sensitive data doesn't fall into the wrong hands.



Gettin' 'Er Done

To start off, you have to have your VM already installed. The VM also has to be powered down. You cannot perform the encryption on a VM that is paused or in a "snapshot" state.

Next, you need to select the VM you want to encrypt. Be sure that the VM says "Powered Off" as the state of the VM. If it doesn't, then start the VM and properly power it off. Then, click either on the "Settings" icon on the toolbar, or on the "General" heading near the center top of the window (outlined in red in the image above).





Now, place a checkmark next to “Enable Encryption,” and choose which level of encryption you want to use. Your choices are either AES-XTS256-PLAIN64 (shown) or AES-XT5128-PLAIN64. The difference is whether you use 128 bit or 256 bit encryption. The third (and default) choice, “Leave Unchanged,” doesn’t seem like the smartest choice. As I’m writing this, I cannot wrap my head around why you might want to use this particular choice.

Just as you should be doing with all of your passwords, choose a strong password using a mix of upper and lowercase letters, numbers, symbols and punctuation marks. Be forewarned: someone out there has already made a [tool](#) to crack weak passwords used with VirtualBox’s VM encryption. The tool uses a brute force method that will make

weak passwords fall like the walls of Jericho, rendering your encryption useless – and potentially exposing your data to prying eyes ... or worse.

With that in mind, enter your SECURE password in the first password entry box. Then, re-enter your password in the second password entry box to confirm it. Now, just click the OK button.

Once you hit that OK button, go do something. Make a sandwich, or grab a snack. VirtualBox will be encrypting your entire virtual hard drive, so it may take a little bit of time. You might get a bit bored watching and waiting for the progress bar to make its way to 100% completion.

International Community PCLinuxOS Sites



Now, whenever you launch your virtual machine, you will be prompted for your VM password whenever you launch it.

Summary

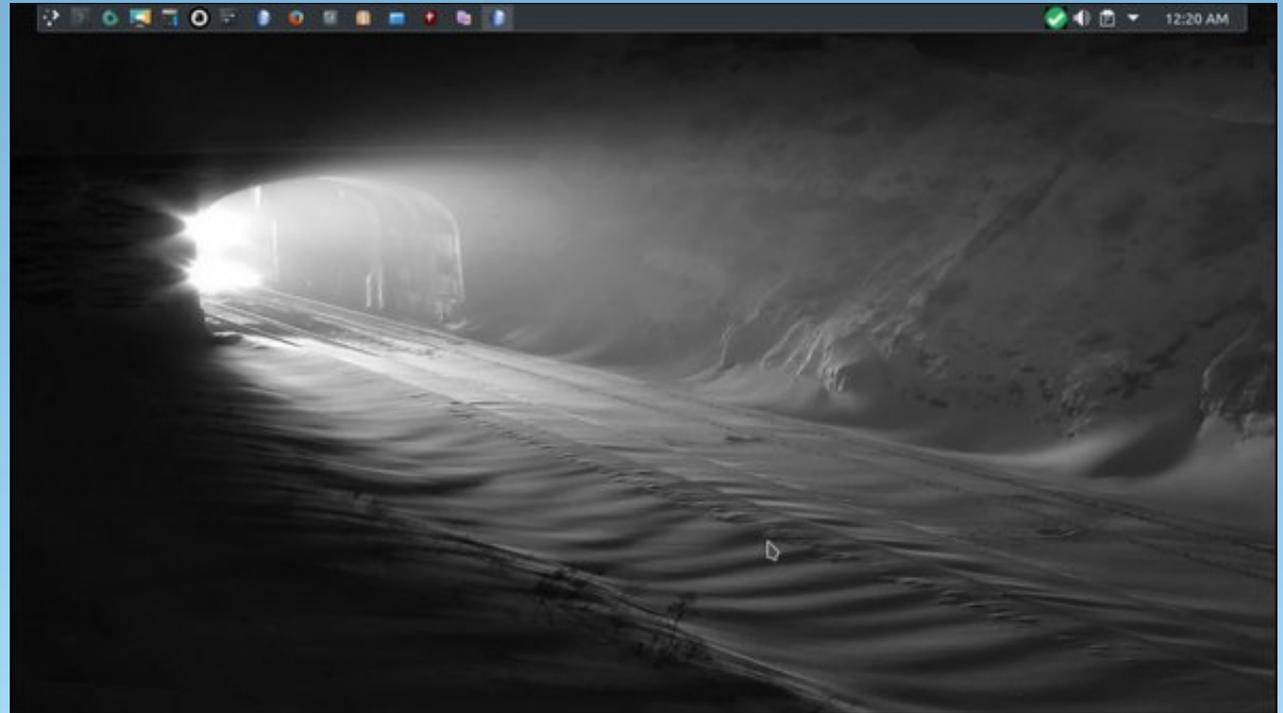
With your privacy and data under assault from multiple vectors these days, you cannot be too careful with your data. An ounce of prevention is worth more than a pound of cure. But once your data has fallen into the wrong hands, there is no cure. Thus, that ounce of prevention becomes the cure. Protect your data and prevent it from being compromised in the first place.

Thankfully, VirtualBox gives you the tools to help protect your data. If you don't use the tools you are provided, then you have no one to blame but yourself for any breaches in security.



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Screenshot Showcase



Posted by pirate, May 18, 2017, running KDE.



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GOG's Gems: Star Trek, 25th Anniversary

by Alessandro Ebersol (Agent Smith)



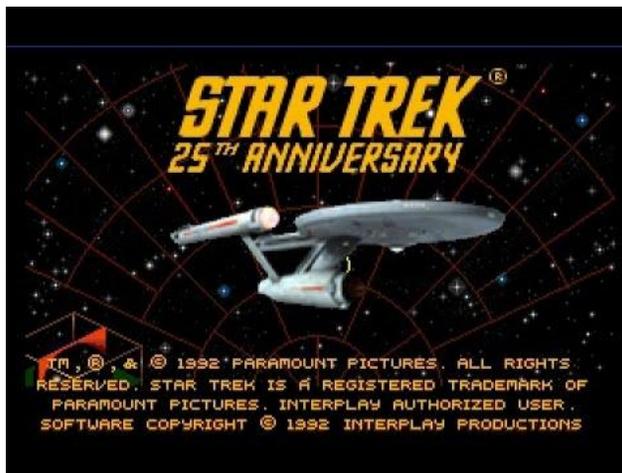
Following in my gems' reviews that GOG has in its catalog, I bring you Star Trek, 25th Anniversary, a fantastic game (well, I'm suspect, since I am a trekker from the time that the original series aired in syndication on TV).

Space, the final frontier...

Star Trek 25th Anniversary - the Game.

Star Trek: 25th Anniversary is an adventure video game developed and published by Interplay Productions, based on the Star Trek universe. The game chronicles various missions of James T. Kirk and the crew of the USS Enterprise. The game was originally released in 1992 for PC, MSDOS, on 3,5" floppy disks, with a later release on CD-ROM with improved sound effects and voices from the actors of the original series. The CD-ROM version, which is available from GOG, is the one I will review.

The player takes the role of Captain James T. Kirk aboard the USS Enterprise, a ship of the Starfleet Federation, as seen in the TV series Star Trek: The



Original Series. It is divided into two main modes, a major bridge view, and a third person view whenever an away team is transported to a planet or space station.

The controls on the bridge are divided among the whole crew, with Montgomery Scott allowing access to shields and power controls, Pavel Chekov controlling navigation and Hikaru Sulu controlling the orbit of the ship, for example. The away team always consists of Kirk, Spock and Leonard McCoy, as well

as one of eight different red shirts, which can die during the mission. (Red shirts dying? What a surprise!) The player interacts with these different modes using a point and click interface via the mouse.

The gameplay works by selecting a part of the body that the player wants to use (for example, lips to speak, eye to examine, etc.) in the function box. The player must solve different puzzles and perform special actions within each level, or mission, in order to progress to the next.

The game was divided into a series of episodes, with each episode starting with a message received from Starfleet Command. They are usually structured to have a battle between ships before the adventure part begins, with the away team on the surface of the planet, space station or on board another ship.

The episodes are as follows:

- **Demon World:** Settlers belonging to a religious sect report having been attacked by "Demons" near their mines. Kirk must discover the truth behind these "demons".
- **Hijacked:** The USS Enterprise discovers that the ship USS Masada was captured by ELASI pirates who are holding the crew hostage. Kirk must find a way to recover the ship and its crew, unharmed.
- **Love's Labor Jeopardized:** The Romulans crossed the Neutral Zone and attacked the Federation Research Station Ark 7. Unfortunately, the attack has created a biohazard situation that the Enterprise team and the Romulans must deal with.
- **Another Fine Mess ...:** When responding to a distress call from a ship under attack by pirates, the Enterprise discovers that Harry Mudd is involved. He is traced back to an abandoned alien spacecraft. The Enterprise crew must discover the connection between the derelict ship, the pirates and Mudd.
- **Feathered Serpent:** A Klingon battle fleet is about to cross the Federation space, in search of a "War Criminal." The Enterprise should find this "War Criminal" to avoid a war.

- **That Old Devil Moon:** Strange power readings were detected from a large asteroid approaching a pre-warp star system. The Enterprise discovers a former base of nuclear missiles that do not realize that the war was over 1000 years ago, and should prevent it from destroying the native civilization a second time.
- **Vengeance:** The Enterprise, responding to a distress call from the USS Republic, finds the ship nearly destroyed. Kirk must find out what happened to the ship and prevent the perpetrators from attacking again. Unlike other missions, this mission is longer and more complex in the CD version of the game. The original version of this episode is only a short segment of the away team followed by an extensive sequence of space combat. These two different versions are available on the CD version, with a dialogue option at the beginning of the episode to select one or another.

On the CD-ROM version of the game, after completing the last mission there's a small card in the credits on Gene Roddenberry with a short story in the voice of William Shatner about his life.

After an agreement with CBS, Star Trek: 25th Anniversary was re-released on GOG.com distribution network, with additional subtitles in German and French, on May 7th, 2015 alongside Star Trek: Judgment Rites and Star Trek: Starfleet Academy For Microsoft Windows, MacOS and Linux. Shortly after, Interplay Entertainment also relaunched Star Trek: 25th Anniversary for the distribution network Steam, however, only for Microsoft Windows and without subtitles.

My experience

I saw the game available for a cheap price in GOG (US\$ 3.86), and bought it. What a wonderful experience. The essence and the spirit of the original series was recreated in this game.

And, of course, the game sports a point-and-click adventure, as are many famous games from Lucas Arts (Day of the Tentacle, Secret of Monkey Island).

The voice acting, featuring the original actors, is very touching. To listen again dear actors who have passed away is an emotional experience (James Doohan, DeForest Kelley and more recently, Leonard Nimoy).



Regarding gameplay, it is the old scheme known of point-and-click adventure, without many surprises. The navigation in space part and fighting other ships is a little tricky to get the hang of. You will not get it at first, because you have to command a good number of people on the bridge of the Enterprise, and until you are good at it, either you will leave the federation space or crash the ship on some planet / asteroid.

Now, a brief review of the game.

Graphics

The graphics are very good for the time, 1991/92, with a VGA resolution. The bitmap graphics are handmade. They are not excellent, by today's standards, but they aged well.



Sound

It is just amazing. All the sounds of the classic series are present in this game, all zaps, toings, kabooms and other characteristic sounds were re-created/adapted from the original soundtrack. Phaser cannons, photon torpedoes, the feeling is amazing. The music also follows the themes of the series, with the original theme by Alexander Courage and other specially created for the game.

Now, even better is the voice acting of the original actors: William Shatner, Leonard Nimoy, Nichelle Nichols, DeForest Kelley, James Doohan, Walter Koenig, George Takei and others who did their best in their roles, creating an immersive and highly rewarding experience. Grade A with praise!

Gameplay

The gameplay is very good, as I mentioned above, like a traditional adventure with the levels in space. Note that, when interacting with NPC's in the game, you should be careful in the dialogues, to do not put everything to lose. Yeah, this is also a feature of the game: take care of what you will talk with NPC's, or you will possibly influence negatively the NPC's actions (rather than help you, it can get in the way).

The game follows an episode scheme, like a season of the TV show. There's only seven episodes, but that guarantees more than two hours of gameplay, easily.



As in the TV series, one episode has no connection with the following, and your actions in one of these episodes will not influence the next ones.

The immersion and gaming experience are wonderful, making it an addictive game, since one wants to know how it will end this (in game) season of Star Trek. And the nostalgia of all who are or were fans of Star Trek is huge. Very good!

Ahh, in time: A tip – Protect the red shirts from certain death during the game. The death of each of them reflects in your score (worsening for every dead red shirt), so do not let any of them die.

Verdict

An excellent game, even more than 20 years old, is still a masterpiece. Interplay has made one of the best games of Star Trek, along Star Trek: Voyager - Elite Force and Star Trek: Bridge Commander, considered the three best games of Star Trek ever made. And it's available for a cheap price: US\$ 3.86. A bargain!

Buy without blinking, if you are a Star Trek fan or a point-and-click adventure game fan.

Buying Star Trek, 25th Anniversary

Star Trek 25th Anniversary was originally made for DOS, and runs perfectly in DOSBox. The package sold by GOG.com in its website also features the manual (PDF), keyboard map (PDF), tip book (PDF) and star map (PDF).

The game url is: https://www.gog.com/game/star_trek_25th_anniversary

You will download the game file with the extension .sh.

After completing the download (somewhere around 346 MB), give the script execute permission (mod + x) and install the game normally.

It will be installed in your /home.

An interesting detail is that the GOG puts its own version of DOSBox with the game. So, I think, you would be better to use the PCLinuxOS DOSBOX version, and ignore the GOG DOSBOX version.

For best effect, I suggest using DBGL (DOSBox Game Launcher), which will ease the management of the game.

So I hope you have fun and boldly go where no PCLinuxer has gone before..!

Until next time!



PCLinuxOS Users Don't

- Text
- Phone
- Web Surf
- Facebook
- Tweet
- Instagram
- Video
- Take Pictures
- Email
- Chat

While Driving.

Put Down Your Phone & Arrive Alive.



PCLinuxOS Puzzled Partitions

	9		8	3		6	5	4
4	2	5	6		1			
							2	
	7	9		8			4	5
			9			2		8
	6	2		5	4			
2					8			7
	5			2	9		3	6
9	3		4					1

SUDOKU RULES: There is only one valid solution to each Sudoku puzzle. The only way the puzzle can be considered solved correctly is when all 81 boxes contain numbers and the other Sudoku rules have been followed.

When you start a game of Sudoku, some blocks will be prefilled for you. You cannot change these numbers in the course of the game.

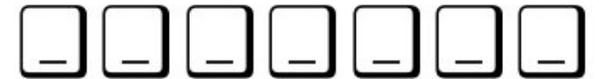
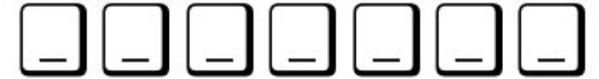
Each column must contain all of the numbers 1 through 9 and no two numbers in the same column of a Sudoku puzzle can be the same. Each row must contain all of the numbers 1 through 9 and no two numbers in the same row of a Sudoku puzzle can be the same.

Each block must contain all of the numbers 1 through 9 and no two numbers in the same block of a Sudoku puzzle can be the same.



SCRAPPLER RULES:

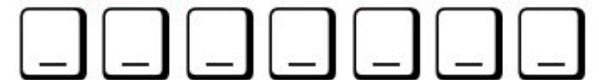
1. Follow the rules of Scrabble®. You can view them [here](#). You have seven (7) letter tiles with which to make as long of a word as you possibly can. Words are based on the English language. Non-English language words are NOT allowed.
2. Red letters are scored double points. Green letters are scored triple points.
3. Add up the score of all the letters that you used. Unused letters are not scored. For red or green letters, apply the multiplier when tallying up your score. Next, apply any additional scoring multipliers, such as double or triple word score.
4. An additional 50 points is added for using all seven (7) of your tiles in a set to make your word. You will not necessarily be able to use all seven (7) of the letters in your set to form a "legal" word.
5. In case you are having difficulty seeing the point value on the letter tiles, here is a list of how they are scored:
 0 points: 2 blank tiles
 1 point: E, A, I, O, N, R, T, L, S, U
 2 points: D, G
 3 points: B, C, M, P
 4 points: F, H, V, W, Y
 5 points: K
 8 points: J, X
 10 points: Q, Z
6. Optionally, a time limit of 60 minutes should apply to the game, averaging to 12 minutes per letter tile set.
7. Have fun! It's only a game!



Triple Word



Double Word



Download Puzzle Solutions Here

Possible score 240 average score 168.



PCLinuxOS Word Find: June 2017

Weddings

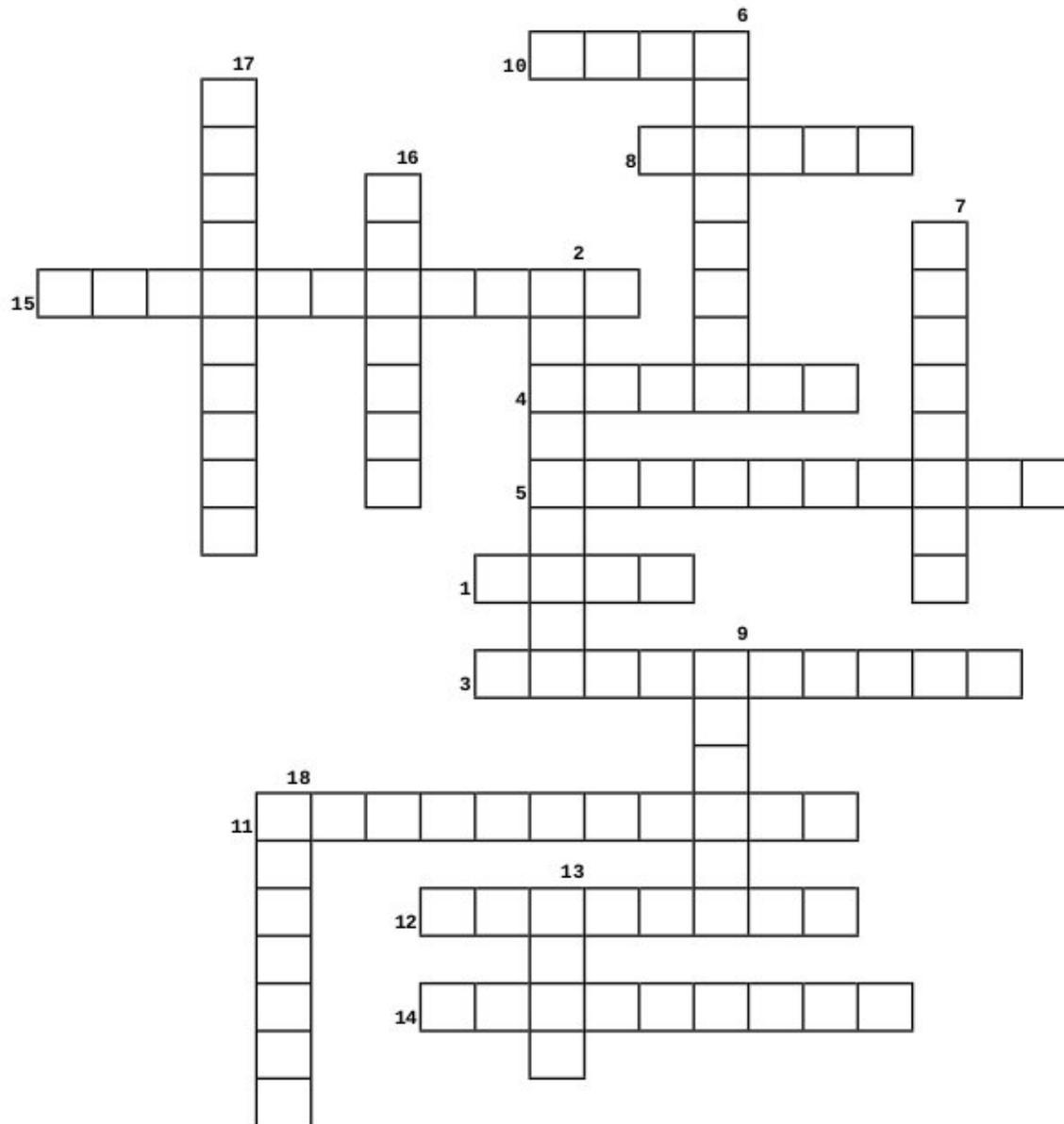
B T H X B O O Z C O R S A G E G I K D T D X U Z Y Y K Q O T
 M D N V H C D E X U L N F U U V E T C Z O I P S A L O P Z O
 L P C Y S O P T D T N F W E E I H M O H I Z D K A K K C N R
 P V R Z W U N Y M I N D K R E J V A A K C N E U O M O V U U
 R N X N C H V E V A R S L Y E P Z I P I N P G M I H S K N N
 G I L H C U Y E Y Q I B T Q W C O H Z P D X D E Z O M O I Q
 B W Z Y O Y R V Z M B P X T W J E O H A I O L N D Y Q X Y S
 T W E D C S L C X D O H P Z E G S P N W J N F E H B T D Z L
 Z Y R O A W F U R O N O H F O N O R T A M T E H U C N X C M
 L U E R E A M P K W O T N K M I P A G I U O Q S O I R X Z N
 T C Y R A L B E H F A O R Y T S J G E R O X I V S N S U I G
 Q M V S Q X E F V C N G G G S G O E N V V N V L O Q O E H H
 S Q I Q R Z S I S O Y R R I Z E W J D Z O Y T F A P N R Z C
 R G L C W K T F I E S A K V G R X P B L V L T I S J P I P Z
 F Y X U U E M T C S P P W L O J K M O Z M D O A G N I T J Z
 Y K J J U W A Y Y L G H Y M L Y A R U I D G U N I V N Q W Z
 N I M Q P T N D U B I L A P R T K W T C L W C C Q E K U U Q
 R I U U I R M T H F Y N K N X L F S O Y B T F E M J C M C P
 B O I V N S S M W P T N C W U Q C W N P R M S E G R O O M O
 B H N T T N E M T I M M O C Z G U Y N Q Y T G E N H U E X E
 C I V C V K K X C D F E W M F N L V I V O A T S J R U N H D
 C S F H U L G Y N R C E F F E I C Z E T G R G X T Z T B K B
 Z F G E W T I A Z I I I C Y M R C D R N I N N S I R T M Y R
 K V Q R S C B Z S N O I T A R B E L E C I Q H Z U T J L P P
 C F A I Z S T U E D R U F L G U A C E S N I J D U Y I Q A M
 O L A S U J M L E F R D T M K M I D S O P F P Q A X H S X B
 Q Y E H N R A X J H U V N I O C A E L I H Z Q D D I X H W Y
 X Q S R C Q U Q C P Q N D P J F L I E V R E T H G U A L P V
 C U S B G T M A V U Y W I Y M B L B Y W A M A R R I A G E J
 U Z B Y G Y S W F M J O S C P V M U S W E E T H E A R T A G

- | | |
|--------------|-----------------|
| anniversary | bestman |
| blessing | bouquet |
| boutonniere | bride |
| celebration | ceremony |
| cherish | church |
| clergy | commitment |
| corsage | courtship |
| engagement | family |
| fiancee | groom |
| happiness | honeymoon |
| husband | invitation |
| kiss | laughter |
| love | maid of honor |
| marriage | matron of honor |
| music | photograph |
| reception | relationship |
| rice | ring |
| romantic | sweetheart |
| tuxedo | veil |
| wedding band | wife |

[Download Puzzle Solutions Here](#)



Wedding Crossword



1. usually at the end of the vows
2. party after the wedding
3. letter or card asking you to come
4. location of many weddings
5. take many of these to remember great times
6. mostly a sign of enjoyment or a funny joke
7. commitment of two people to spend their lives together
8. playing during the reception
9. many times the groom's apparel
10. goes with the bride's dress
11. flower in his buttonhole
12. event which joins a couple in marriage
13. a symbol of love
14. vacation after the wedding
15. celebration every successive year
16. flowers on her dress or wrist
17. promise made between couples
18. the bride carries it and may throw it later

[Download Puzzle Solutions Here](#)

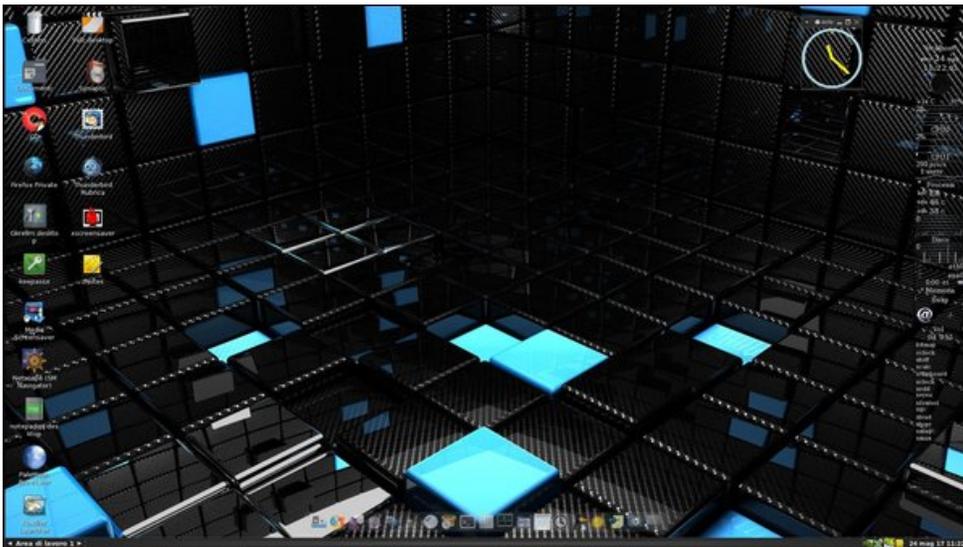
More Screenshot Showcase



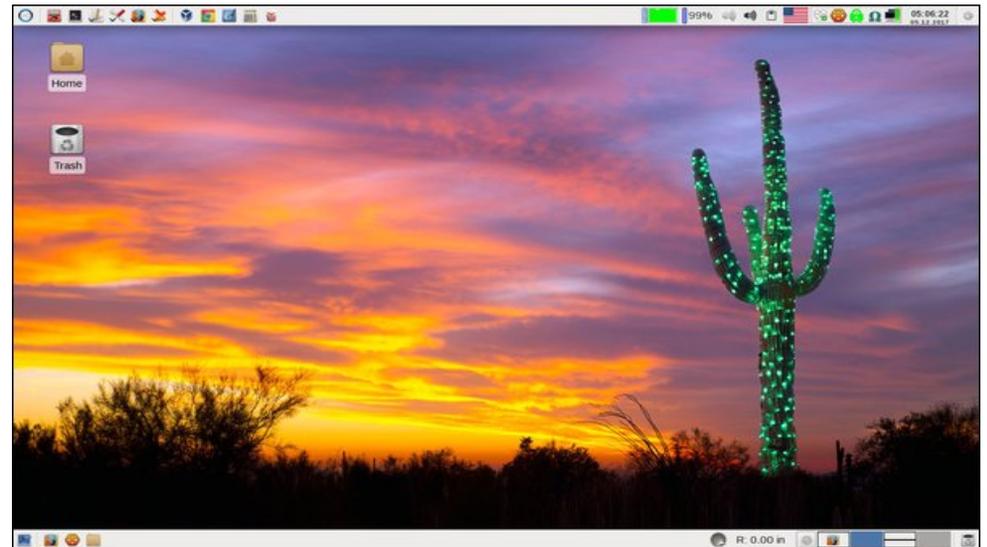
Posted by Agent Smith, May 13, 2017, running LXDE.



Posted by jogurtmen, May 5, 2017, running KDE.



Posted by francesco bat, May 24, 2017, running Fluxbox.



Posted by parnote, May 13, 2017, running Xfce.