Development Environment for OS Released 4. April 2023

Access to Linux

As alternatives to the computer workplaces in the faculty's pool-rooms, the following options could give you a Linux development environment:

- **Linux-Server of the university**
  Every student of TU Dresden can connect to the login server `login.zih.tu-dresden.de` via SSH using ZIH account. The connection to the Linux server is made through SSH. (Under Windows 10 and 11 you can use SSH in the Powershell.[1]).
  Further information:
  https://tu-dresden.de/zih/dienste/service-katalog/arbeitsumgebung/datenspeicher/login_server

- **Windows-Subsystem for Linux (WSL)**
  The WSL is a compatibility layer to run linux programs under MS windows 10. You can find an installation guide here: https://docs.microsoft.com/en-us/windows/wsl/install. After the setup you must run the following commands to install several packages: `sudo apt install make build-essential`.[2] Should any package be missing in the list, feel free to tell us.

- **Virtual machine: the OS-VM**
  This option is recommended, if you want to work in a graphical environment without spending much time on configuration. Follow the instructions below to set up your VM.

The Operating System Virtual Machine

If you want to do the OS exercises using MS Windows at home, a VM *(Virtual Machine)* with a Linux guest system comes in handy. We provide a VM, that is fully configured and ready-to-use out of the box.

For the hasty

1. Download and install the newest VirtualBox (follow the installation guide):
   https://www.virtualbox.org/wiki/Downloads
   Attention: The VM requires VirtualBox 6 or newer versions for 64-bit systems.[3]

2. Download the OVA image:
   https://tu-dresden.de/ing/informatik/sya/professur-fuer-betriebssysteme/studium/vorlesungen/bs/uebungsmaterialien

3. Start VirtualBox and import the previously downloaded OVA image using "Import Appliance".

4. The username and password for the login are **studi:studi**. The input field for the password will not show stars as you type, don't worry.

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[1] For older Windows versions, you can use a SSH Client such as Putty.

[2] For the OSC lab, you need several more packages. Please refer to the link under section *OOStuBS on your own machine*
https://tu-dresden.de/ing/informatik/sya/professur-fuer-betriebssysteme/studium/vorlesungen/betriebssystembau/lab-tasks/development-environment,

[3] Normally, modern PCs come with a 64-bit system installed. Under Windows 7, 8.1 and 10 you can find out whether it runs the 32- or the 64-bit version by following the instructions in the link (Windows 11 is 64-bit only):
https://support.microsoft.com/de-de/help/13443/windows-which-version-am-i-running

5. In case you need root privileges, login as **root:bsvm**. For security reasons you should not work as root user longer than necessary. Otherwise you may break the system.

For those who need detailed instructions

To run the virtual machine, you need the software **VirtualBox**. You can download it from the following website: https://www.virtualbox.org/wiki/Downloads .

**Attention:** For 64-bit systems the VM requires VirtualBox 6 or newer versions.

Please follow the installation instructions to install VirtualBox. In the end you can start VirtualBox from either the start menu or desktop shortcut. The following window will show up.[4]
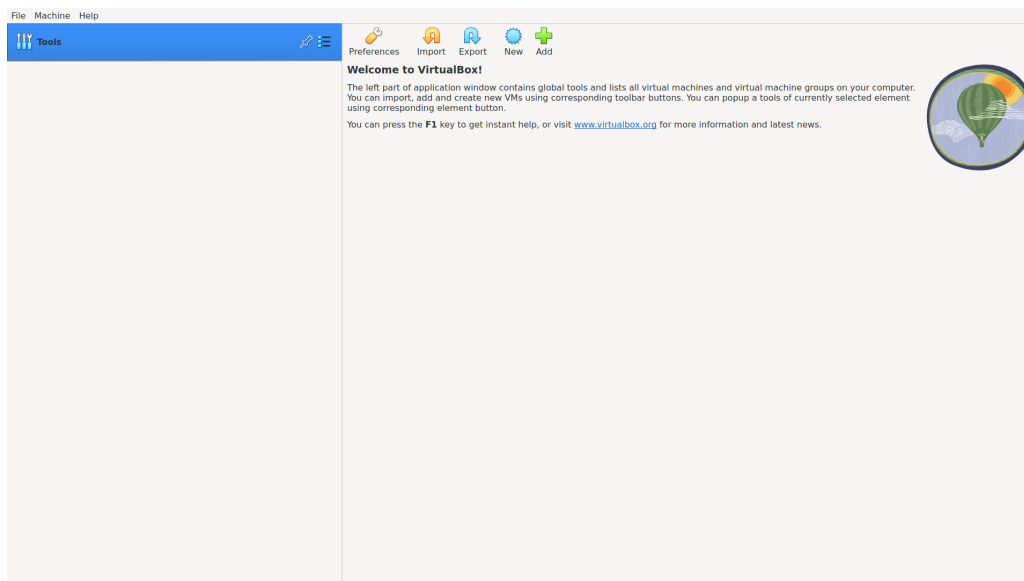
Now click "Import Appliance" under the "File" menu, you will be prompted to choose an OVA image. Chose the folder where you downloaded our OVA image (https://tu-dresden.de/ing/informatik/sya/professur-fuer-betriebssysteme/studium/vorlesungen/bs/uebungsmaterialien), select "VB_Image_BuS.ova" and click "Next". An overview with the VM's configuration will show up (figure on the left).
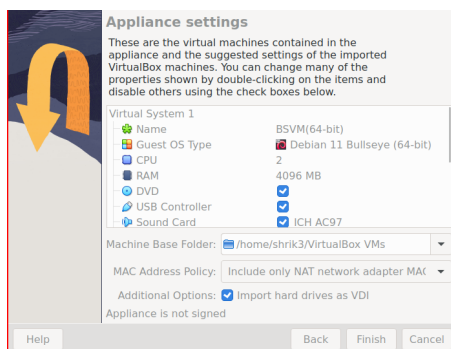

The virtual machine to be imported
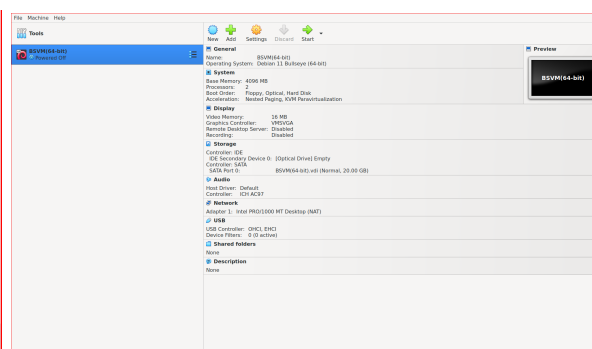
Overview of all virtual machines

Click "Finish" and the virtual machine will be imported to VirtualBox. Double click the virtual machine "BSVM(64-bit)" inside of the overview panel (figure on the right), and the VM will start.

Wait for the login screen to show up, then you can log in with the username **studi**, and the password **studi**. The graphical desktop should show up in a short moment.

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[4]The screenshots in this guide are taken from a Linux machine and may look slightly different than what you see on your machine.
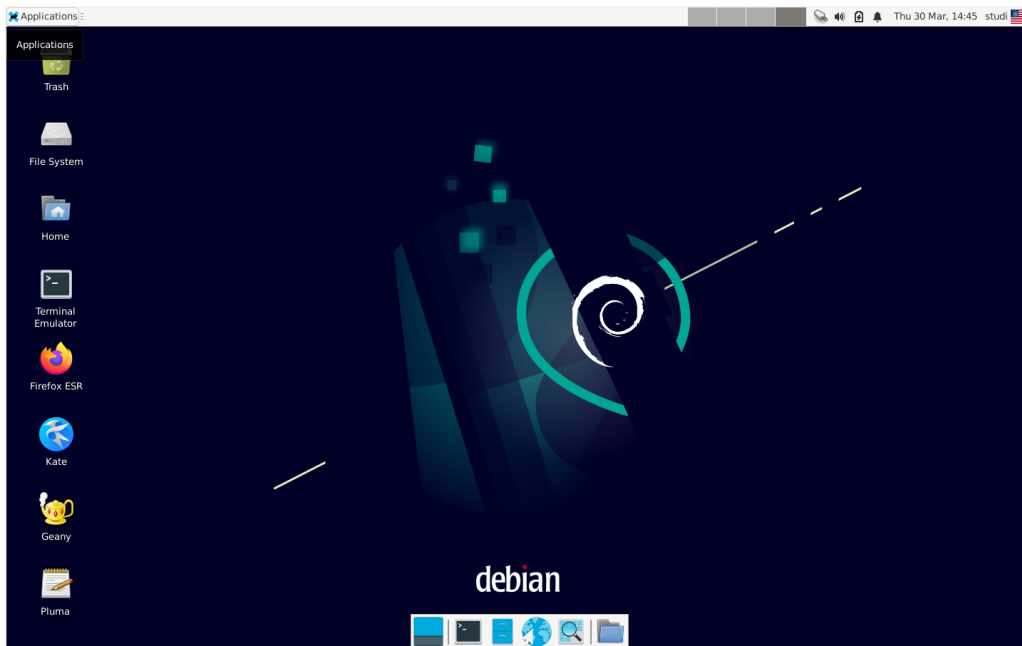
The VM is already set up. On the left side of the desktop you will find some important programs. There are three editors that you can edit your source code with, a terminal emulator and a browser. When you want to quit the VM, press Ctrl + Alt at the same time to free your mouse cursor (this is normally not necessary though). You can simply close the window and choose "Send the shutdown signal", or optionally click "Machine" – "ACPI Shutdown".
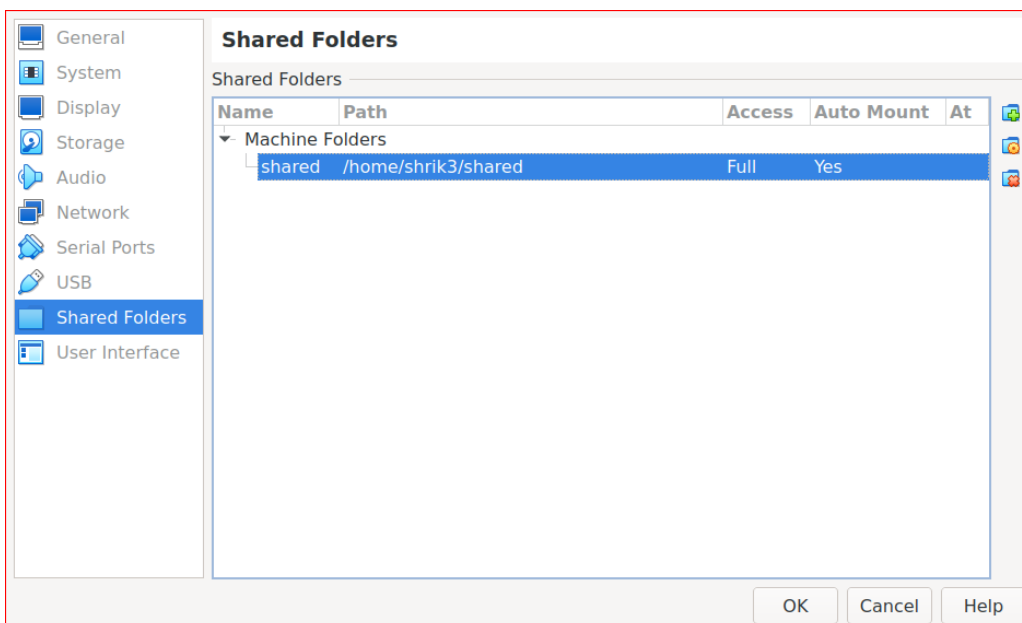
Sharing files between host and guest – you can activate "Shared Folders", so that you can exchange files between the host and guest system. For that to work, right click BSVM(64-bit) in the main window of VirtualBox and choose "Settings". Under the tab "Shared Folders" you can add directories that are to be shared. The option "auto-mount" must be activated. This can also be set permanently. The shared directories will be mounted to **/media/sf_(name)** on the guest system.

Known Problems

- VirtualBox can not run the 64-bit OS VM on a 32-bit host system (e.g. Windows 10 32-Bit).

- Activating *Hyper-V* (by default not activated) can cause problems.

- If you get an error message when starting VirtualBox that VT-x/AMD-V is not activated, you probably need to activate it in your BIOS settings.

In case you have difficulties dealing with Linux or VM, don't hesitate to seek for help in the Matrix room or in the OPAL forum! (Note that the OSC lecture does not use OPAL at all.)