



**acontis technologies GmbH**

**SOFTWARE**

# **Hypervisor-WindowsGuest-Guide**

**acontis Real-time Hypervisor and Windows guest**

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## 1 Introduction

This guide describes how to set up a Windows guest in the acontis Hypervisor. It is assumed that the steps listed in the Hypervisor Quick Start guide have been successfully executed.

## 2 Copy a Windows ISO installation media to the Hypervisor Host

In a first step, we need to copy the Windows installation media (ISO file) into the Hypervisor filesystem.

### 2.1 Using Filezilla (recommended)

- Open a shell (right click on desktop and select *'Open Terminal here'* or press CTRL + ALT + T) on the Hypervisor Host.
- Determine the IP address of the system (with `ifconfig` command and through `inet` entry):

```
rte@RTV-TP104:~$ ifconfig
enp2s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 172.17.10.5 netmask 255.255.0.0 broadcast 172.17.255.255
    inet6 fe80::cbb:85f1:38d3:fa2a prefixlen 64 scopeid 0x20<link>
    ether 90:1b:0e:18:c9:83 txqueuelen 1000 (Ethernet)
    RX packets 4618420 bytes 4033770375 (4.0 GB)
    RX errors 0 dropped 8865 overruns 0 frame 0
    TX packets 1460482 bytes 96608727 (96.6 MB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 6864 bytes 427092 (427.0 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 6864 bytes 427092 (427.0 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

vnet0: flags=99<UP,BROADCAST,NOTRAILERS,RUNNING> mtu 1500
    inet 192.168.157.1 netmask 255.255.255.0 broadcast 192.168.157.
↪255
    ether 00:60:c8:00:00:00 txqueuelen 1000 (Ethernet)
    RX packets 765775 bytes 74216258 (74.2 MB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 767935 bytes 74780268 (74.7 MB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

In this *example* the IP address is 172.17.10.5.

---

**Hint:** The device name `enp2s0` **differs** on different PC/IPC's!

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- Open Filezilla (get current version from <https://filezilla-project.org/>) and create new connection entry:

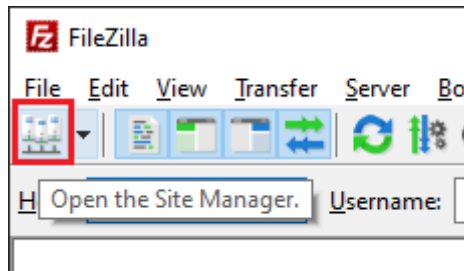


Fig. 2.1: Create new entry through site manager.

1. Push **New site** button
2. Give a qualified name
3. Select *SFTP - SSH File Transfer Protocol*
4. Give host IP/name. In screenshot above the last byte is X-ed out. Replace it with the ‘detected’ IP address.
5. Enter User name (same as at Hypervisor install)
6. Enter password (same as at Hypervisor install)
7. Push **Connect** button

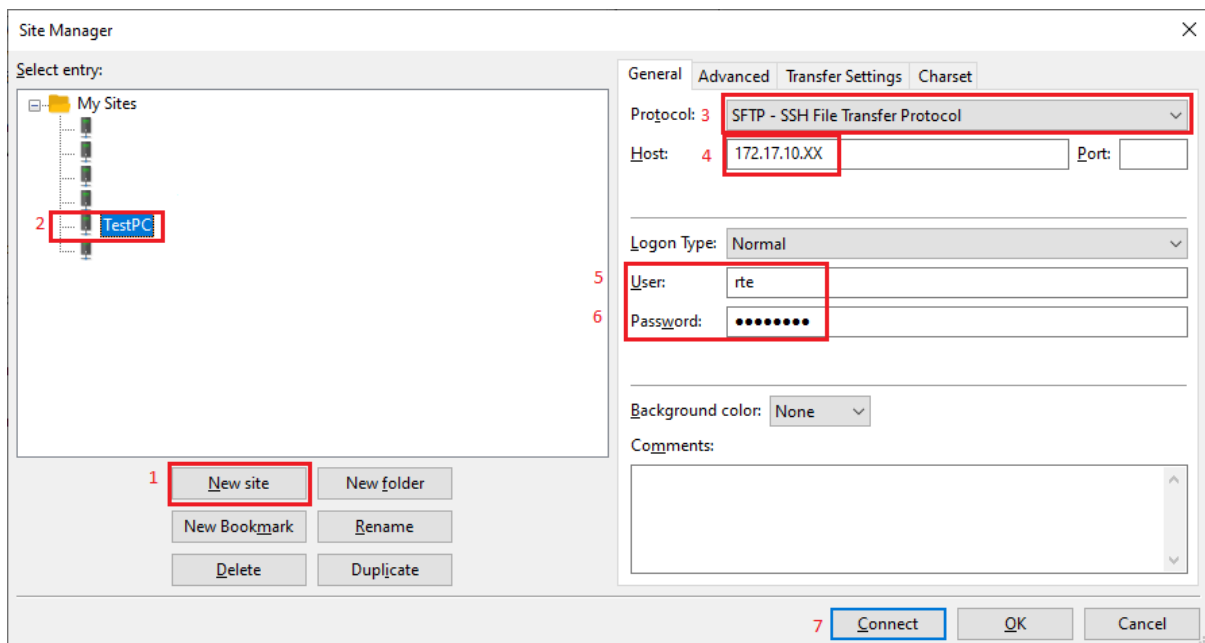


Fig. 2.2: Site manager dialog.

Select the installation media file (the .iso image) in the *Local* tab on the left and *upload* it to /hv/guests/examples/windows into the *Server* tab on the right.

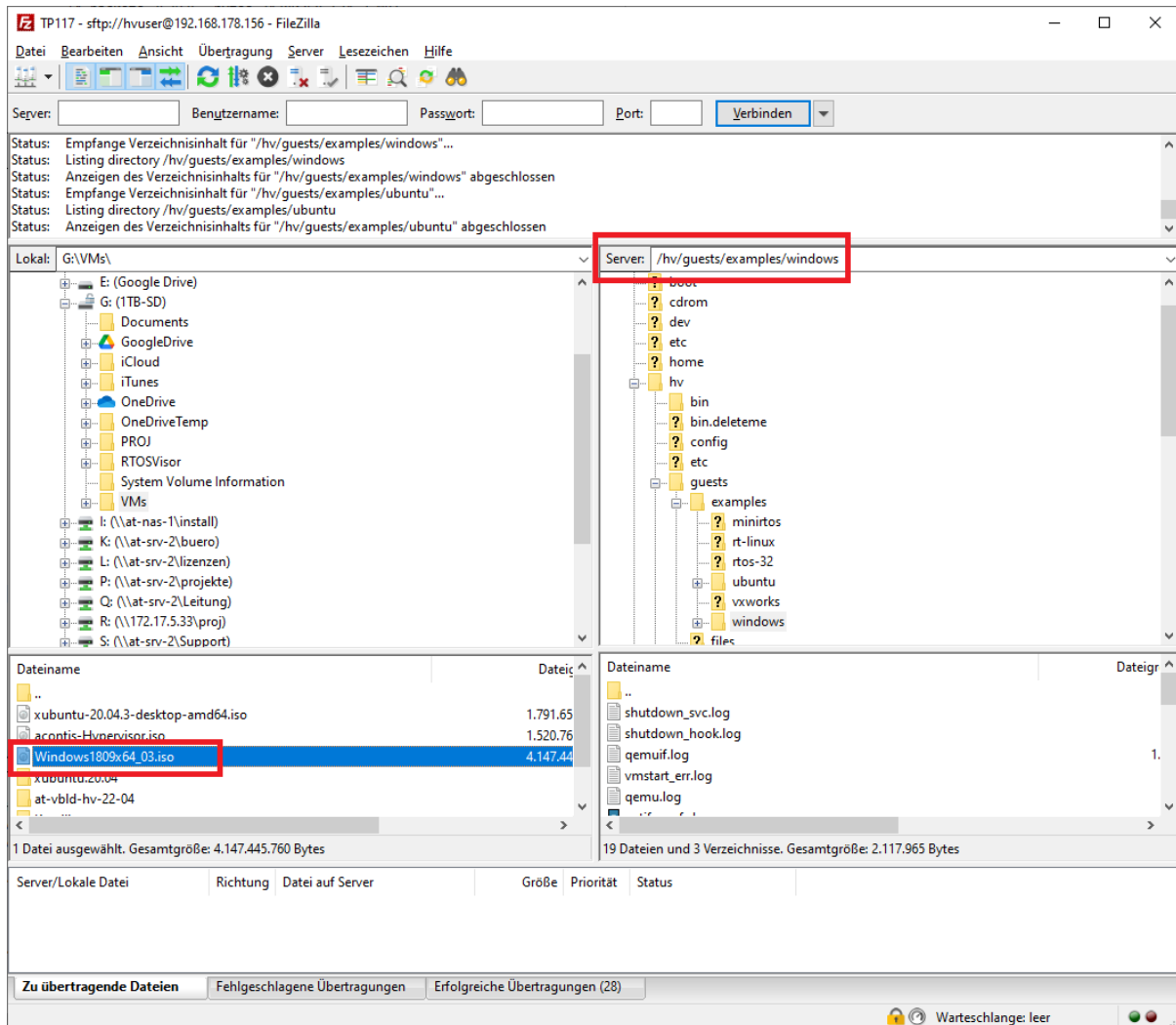


Fig. 2.3: Download installation media

## 2.2 Using a Windows Share

Here we will show how this can be accomplished using a network share (`//NameOrIpAddressOfPcWithShare/NameOfShare`) in the Windows system. We assume the network share has a directory `/hv` containing the file `Windows.iso`. We need to install the network client software (`cifs`) in the hypervisor and then mount the Windows network share.

```
$ sudo apt-get install cifs-utils
```

```
$ sudo mount -t cifs //NameOrIpAddressOfPcWithShare/NameOfShare /mnt -o  
→ user=NameOfUserWithAccessToShare
```

Copy the Windows 10 ISO image to `/hv/guests/files`.

```
$ cp /mnt/hv/Windows10.iso /hv/guests/files/Windows10.iso
```

The mount point `/mnt` isn't needed anymore and thus will be unmounted.

```
$ sudo umount /mnt
```

### 3 Guest Configuration

Prior to installing the guest, we need to configure the respective virtual machine (e.g. number of CPU cores, network settings etc.). The configuration files `guest_config.sh` and `usr_guest_config.sh` are located in the guest folder. The meaning of each configuration setting is explained in detail in those files. You need to edit these files and adjust them according to your needs and environment.

**Caution:** If the guest is controlled by the System Manager tool, you must not change the `guest_config.sh` file (the content may be overwritten by the System Manager), instead uncomment the respective settings in `usr_guest_config.sh`.

Example guests located in `/hv/guests/examples` are **not** controlled by the System Manager.

The number of CPU cores must **not** exceed the number of physical cores available in the system and not assigned to Real-time guests. For example, if on a *quad core* CPU, you need 2 cores for Real-time guests, the number of cores for the Windows guest must not exceed 2. The default parameters should fit for most cases.

```
$ gedit /hv/guests/examples/windows/guest_config.sh (and/or  
→ usr_guest_config.sh)
```

```
# Adapt following lines to your system and needs:  
vmname=...  
vmid=...  
windows_guest=...  
cdrom_iso=...  
num_cpus=...  
ramsize=...
```

You have to set the `cdrom_iso` parameter to the appropriate folder where the installation media ISO file had been copied before.

By default, the network connection is set up automatically (using DHCP). Please check the [Hypervisor Manual](#) for other settings.

**Caution:** Automatic network setting will only work, if the Ethernet cable is connected!

**Caution:** Please do not configure more CPUs than physically available (CPUs used for the Real-time OS are not available for the Windows guest). Example: The maximum number of CPUs on a quad-core CPU where 1 CPU is used for the Real-time OS is 3.

**Caution:** Please do not configure more RAM than available. The VM may unexpectedly crash if too much RAM is configured. You can determine the available RAM as follows:

```
$ cat /proc/meminfo | grep MemAvailable
```



## 4 Guest Installation

After VM configuration you need to start the guest for the first time. The guest console will be shown then (the guest output or desktop).

```
$ cd /hv/guests/examples/windows
$ hv_guest_start -view
```

**Caution:** if you see an error like (remote-viewer:5083): Gtk-WARNING : 11:15:50.298: cannot open display: :10.0, you may using a RDP connection when installing the guest. In this case the GUI Window (remote-viewer) will not be shown. To fix this execute the commands

```
$ sudo -u username xhost +SI:localuser:root
```

where the username is the username you are logged in with. Then execute `hv_guest_console` to start the viewer.

The installation media iso file will be detected by the virtual bios, you need to press a key to boot from it:



Fig. 4.1: Boot from ISO file.

**Hint:** In case no key was pressed in time or the installation media was not found, the EFI shell will be started.

- Option a) You can leave into BIOS by entering `exit`. If you also leave BIOS the boot begins again and you can press a key to boot from CD.
- **Option b) You can manually start the CD's bootloader by entering**

```
- $ FS0:  
- $ \EFI\BOOT\BOOTX64.EFI
```

---

**Hint:** If the start EFI file is not set in the BIOS (BOOTX64.EFI does not exist), you need to type `exit` to leave the shell and switch into the BIOS. There you need to select the CDROM in the `boot` menu.

---

## 5 Windows Installation

- Follow the steps as usual until the **Where do you want to install Windows** dialog shows up

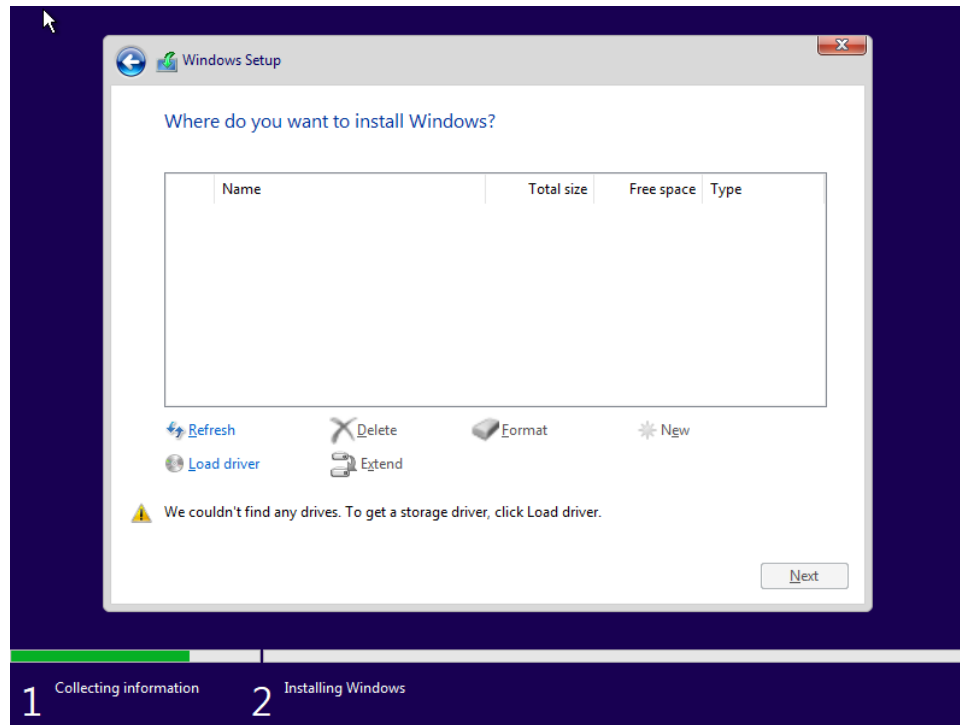


Fig. 5.1: Where do you want to install Windows.

You need to browse to the CD Drive with the virtio drivers. Select the appropriate driver in the respective folder (e.g. \viosstor\w10\amd64).

- Then select **Load driver** → OK → **Red Hat VirtIO SCSI controller” (W10)** → Next

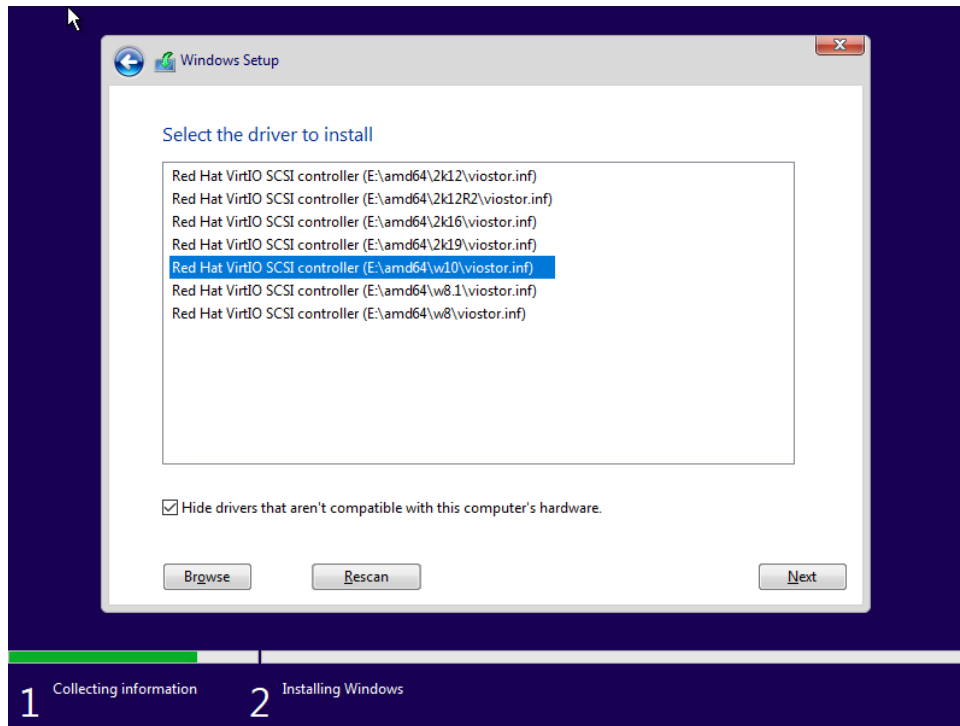


Fig. 5.2: Windows Install driver select.

- Select your drive (50GB)

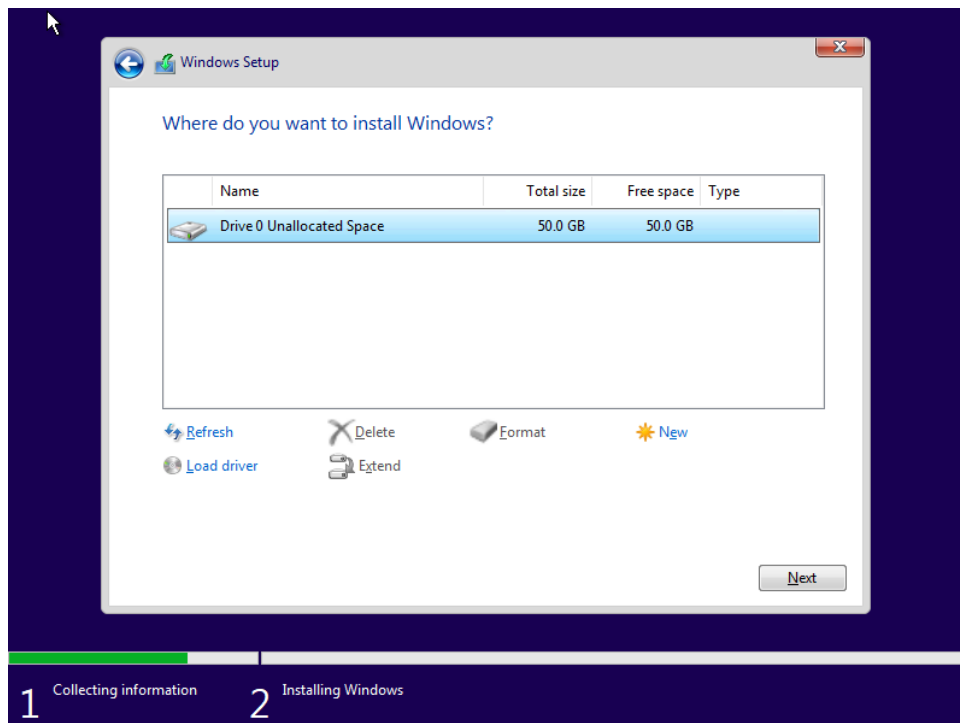


Fig. 5.3: Windows Install disk.

- Finish Installation (please note, there is no network/internet available in this setup)

## 6 Hypervisor Guest Tools

After successfully installing Windows you need to install the SPICE Windows guest tools.

- Open the Windows Explorer and install the spice guest tools.

The installation file is located in CD Drive (E:) virtio-win-0.1.215: virtio-win-guest-tools. Select and start to install these tools. In case a message box appears to confirm driver installation, please confirm install the driver(s).

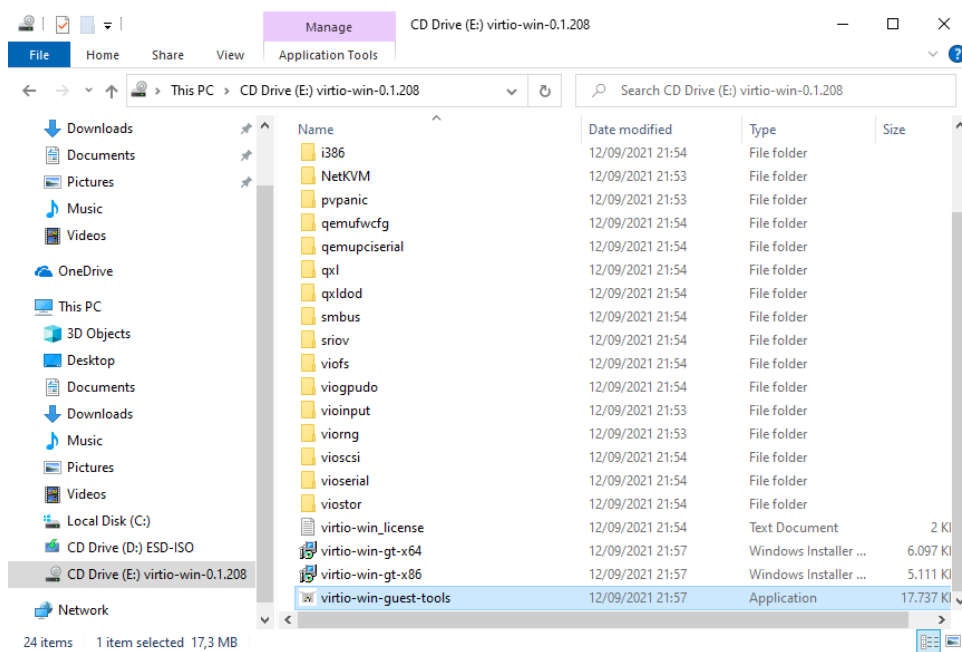


Fig. 6.1: SPICE/virtio-win guest tools.

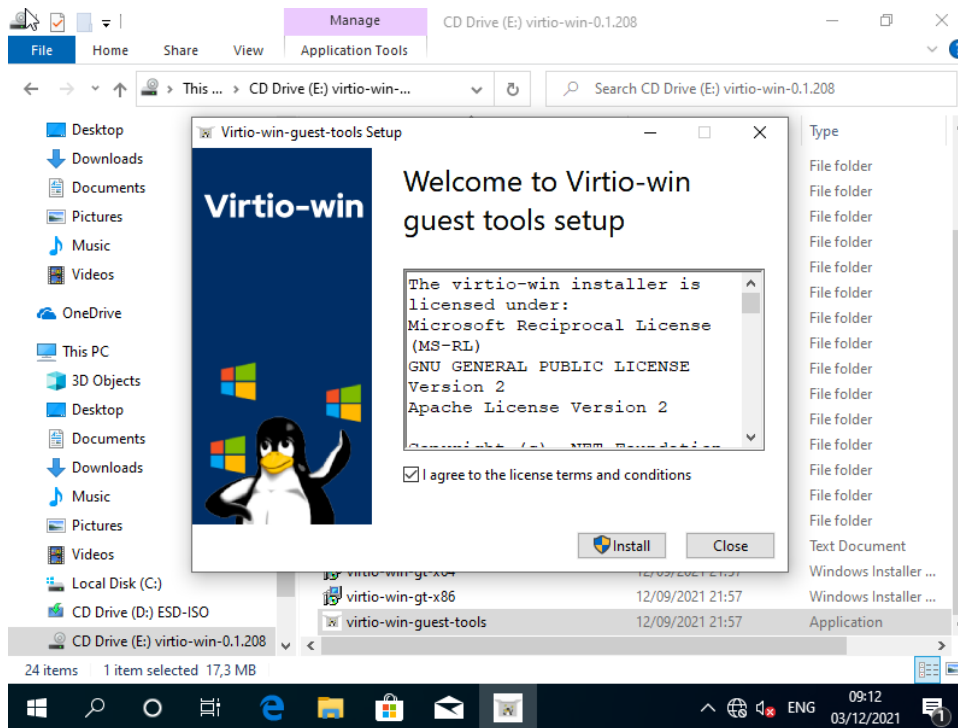


Fig. 6.2: SPICE/virtio-win guest tools setup screen.

After the setup finished, you may not be able to use the mouse anymore. This is related to a new driver installed which is not supported by the viewer application. In any case, close the setup message box (type enter, while the focus is on the finish box).

- Shutdown Windows

You need to shut down the guest (do **NOT** reboot Windows!). If this not possible inside the guest, please run `hv_guest_stop` in the guest folder (`/hv/guests/examples/windows`). If shutdown does not work, you need to close the setup windows before (e.g. using tab keys to select the finish button).

- Adjust the file `usr_guest_config.sh` (to avoid booting the installation media again)

```
$ gedit /hv/guests/examples/windows/usr_guest_config.sh
```

```
comment "cdrom_iso" with #
```

- Start the Windows guest

```
$ hv_guest_start -view
```

Due to hardware changes, Windows may automatically reboot once. Mouse and desktop may still not work properly. In this case, please install all the latest Windows updates.

**Caution:**

**In some cases the guest network does not work after guest tools installation. In case a guest reboot does not help you may try to execute the following steps:**

- Open the Windows Device Manager

- Open “Network Adapters” and check if “Red Hat VirtIO Ethernet Adapter” has an exclamation mark near its icon.
- Delete all adapters with the exclamation mark (drivers deletion checkbox should not be checked out!).
- Then let Windows look for hardware changes, the drivers should be found and installed properly.

## 7 RTOS Communication Support

To communicate with an RTOS via the Hypervisor we need to install `RTOSVisor.exe` containing the required drivers and packages.

**Hint:** If you encounter a message like `Applying execute package: RteRuntime_x64. Error 0x80070643: Failed to install MSI package when running this command`, you may have got a **test** version of the `RTOSVisor`. In **test** versions **unsigned** drivers are included. You need to enable *testsigning* **before** installing the guest support.

- Step 1: Run Command Prompt as **administrator**.
- Step 2: Input the command in the window: `bcdedit /set testsigning on` and press Enter. Reboot the guest.

Open CMD prompt in Windows guest and enter the following:

```
Call \\10.0.2.4\qemu\files\RTOSVisor.exe
```

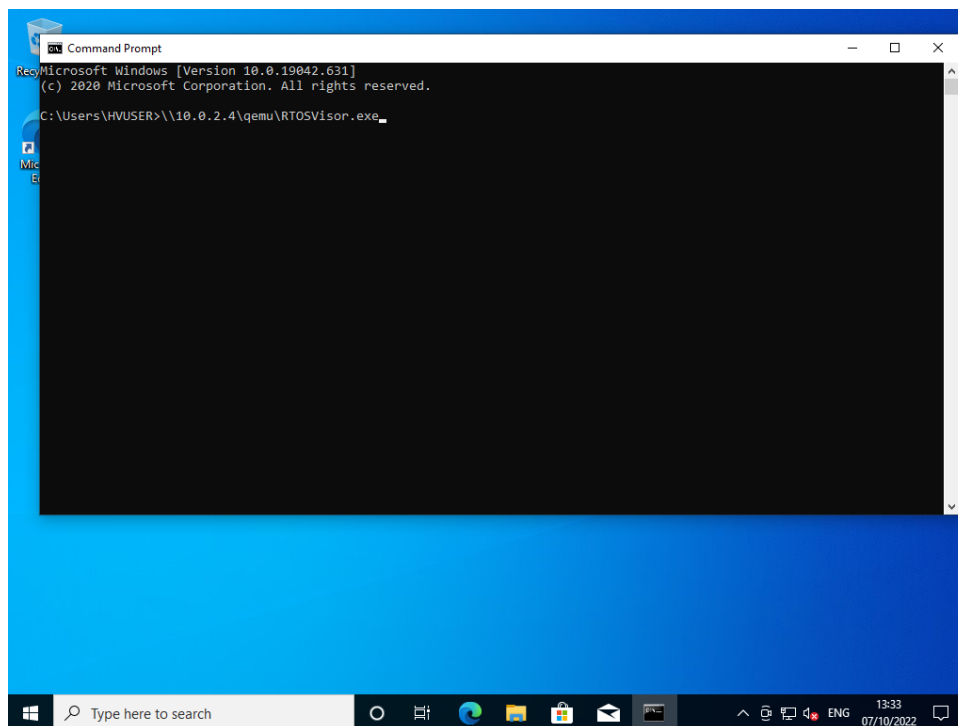


Fig. 7.1: Setup command.



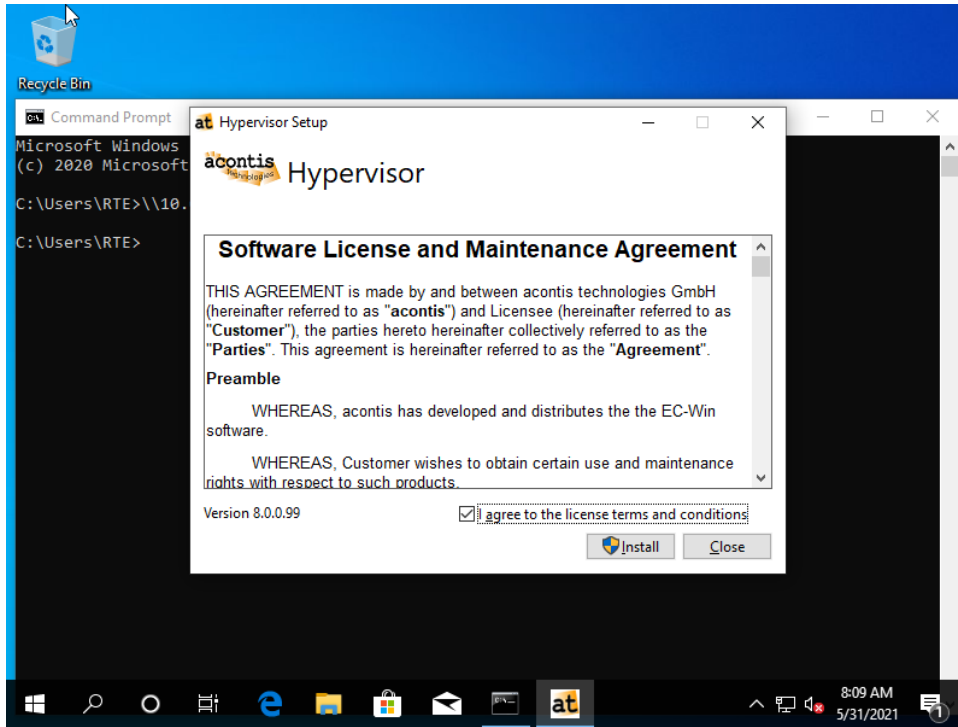


Fig. 7.2: Running setup.

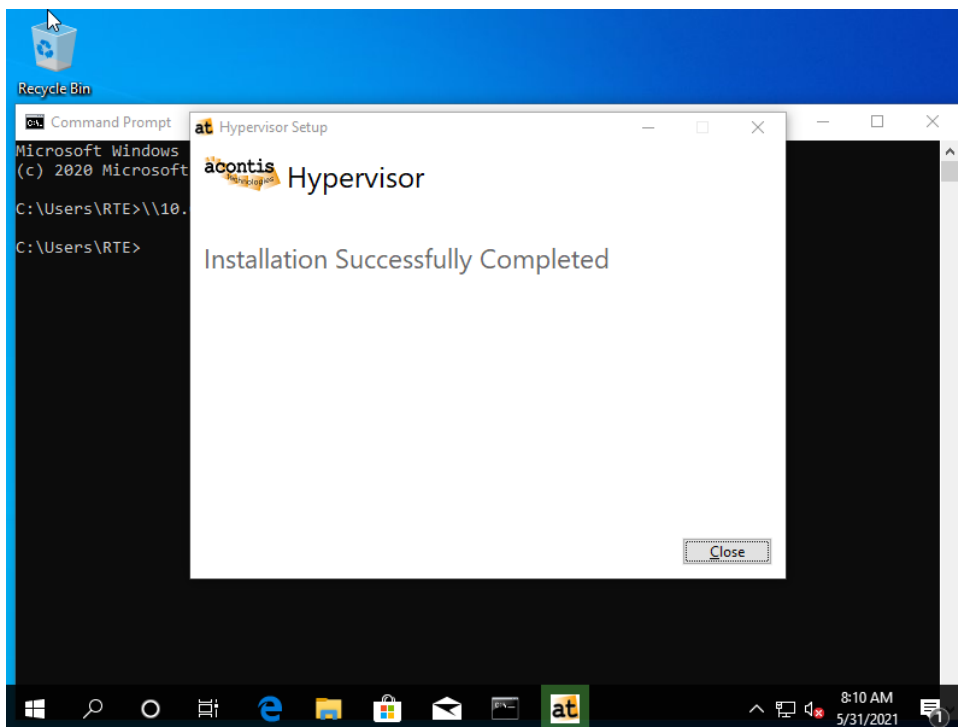


Fig. 7.3: Installation successful.

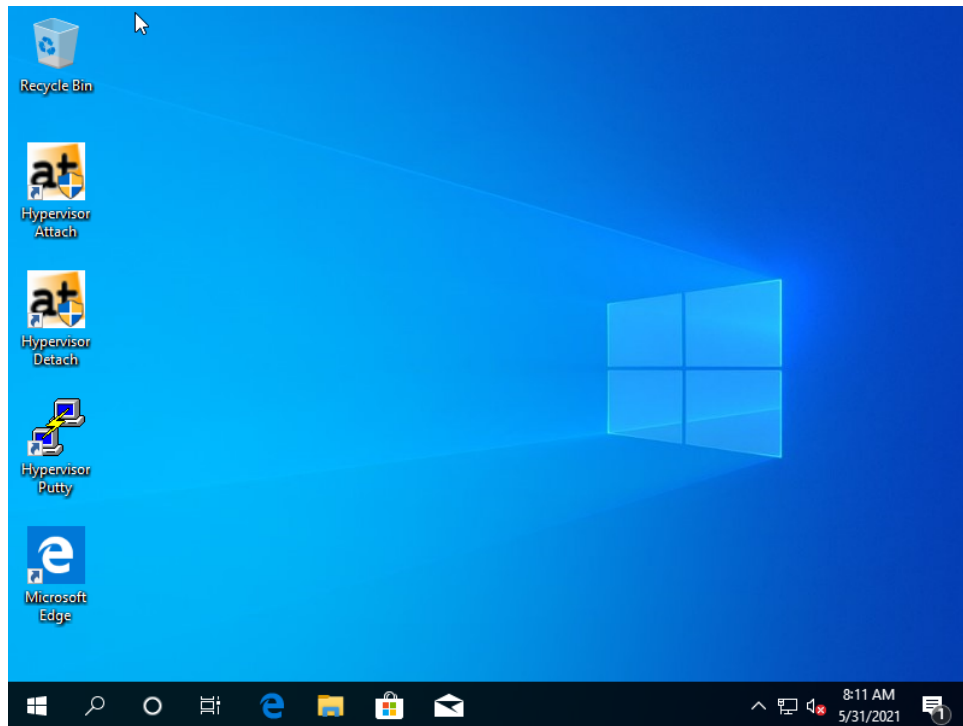


Fig. 7.4: New desktop icons.

## 8 Power & sleep

Sleep and Hibernate are currently not supported (S3 or S4 mode). Disable Sleep (Windows Settings – System – Power and sleep):

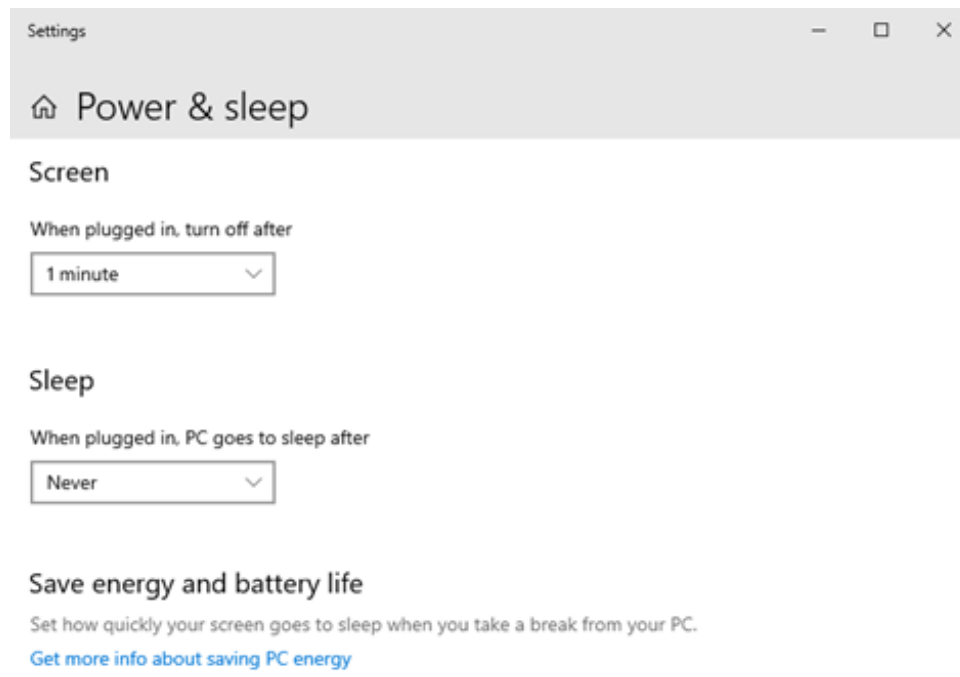


Fig. 8.1: Power and Sleep settings.

## 9 Windows and Real-time guest in parallel

In this step, we will run Windows and Real-Time Linux in parallel.

**Caution:** The `hv.config` configuration file is a link to the RT-Linux example guest configuration file. See also chapter **Example guest folders** in the [Hypervisor Manual](#) for more information.

- Shutdown Windows, do **NOT** reboot!
- Reboot the Hypervisor Host
 

```
$ sudo reboot
```
- After system reboot, open a shell terminal again (right click on desktop and select *'Open Terminal here'* or press CTRL + ALT + T). Then, run the Real-time Linux guest
 

```
$ cd /hv/guests/examples/rt-linux
$ hv_guest_start -view
```
- Open a second shell terminal
- Start the Windows guest
 

```
$ cd /hv/guests/examples/windows
$ hv_guest_start -view
```
- After logging in into Windows, execute “Hypervisor Attach” (Desktop icon)

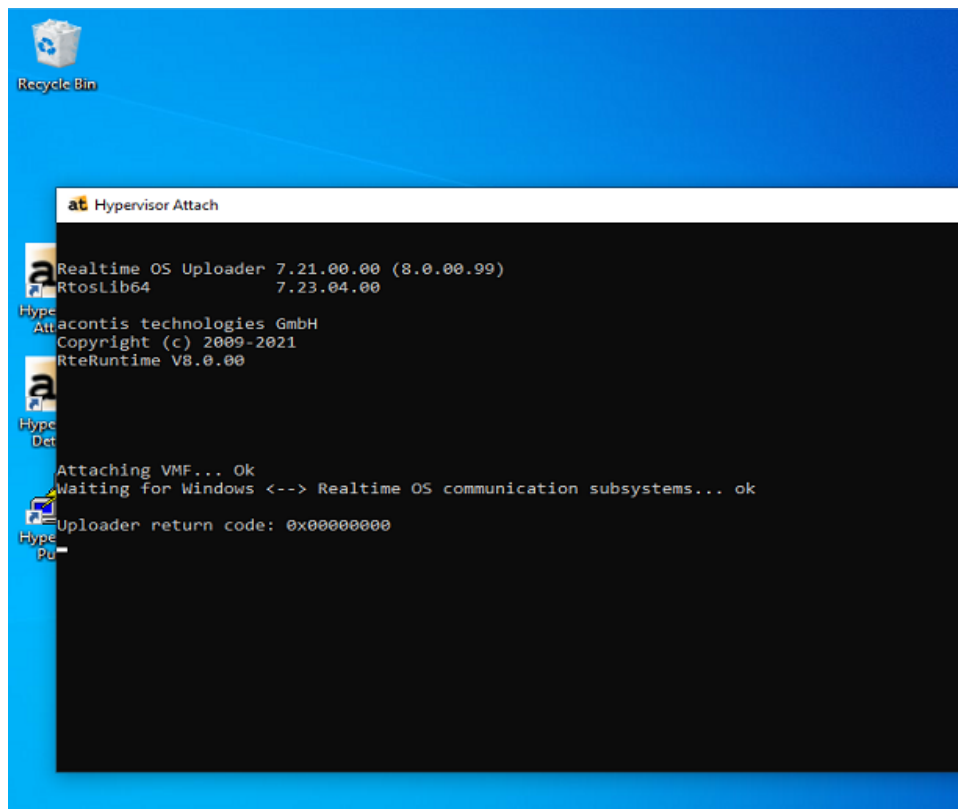


Fig. 9.1: Hypervisor Attach.

- Download and install the appropriate putty package from <https://www.putty.org/>
- Open the RT-Linux shell: execute “Hypervisor Putty” (Desktop icon)

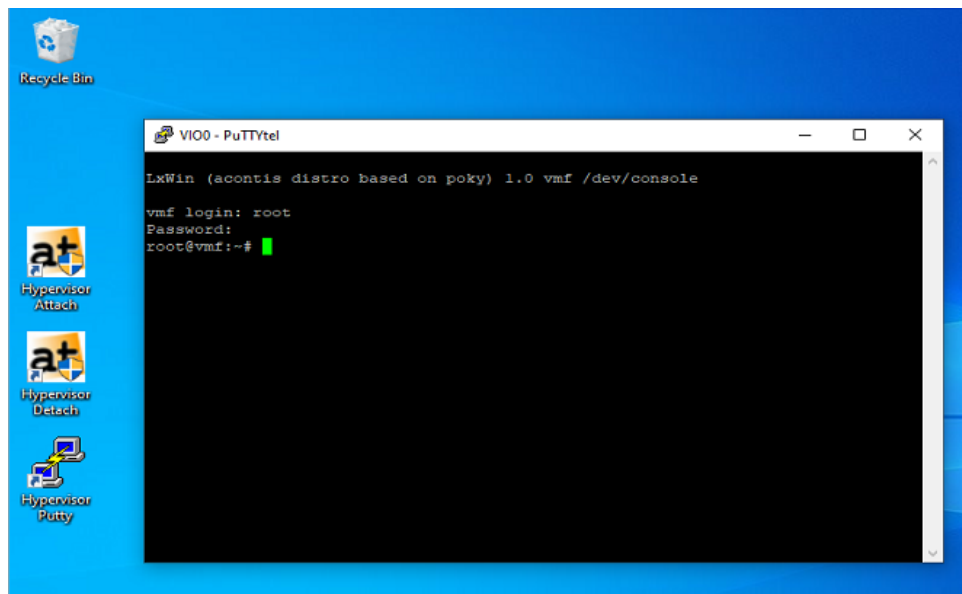


Fig. 9.2: Linux Shell.

- Log in into Real-Time Linux and run the Real-time demo:

```
$ vmf64 login: root
$ password: root
$ Realtimedemo
```