

General Description

Introduction

This document describes the ICT regional championships in the category “ICT Network Systems Administration”, also known as trade/skill 39.

The competition is divided into three independent parts, covering the topics “Networking”, “Windows Server” and “Linux Server”. You are free to perform these parts in any order and have a total of **three hours** available to complete the competition.

To provide all participants with the same starting situation and avoid tedious setup routines of operating systems, we provide two complete virtual machines, one for Windows and one for Linux, which **must** be used during the competition. These virtual machines come with all required applications and services preinstalled and also contain helper binaries to generate grading files.

You will receive further information about the specific tasks and grading process during the competition.

Bring your own device (BYOD)

Each competitor brings his own device to the competition, which will then be used for running the provided virtual machines. Internet access during the competition is allowed, however you are not allowed to discuss the competition at any time with other persons, including fellow candidates.

The virtual machines for the competition will be distributed a few days in advance, to give everyone enough time for downloading and verifying these files. The VMs will use full disk encryption to guarantee that no competitor is access to unfairly access the specific tasks in advance. You will be provided with the password to decrypt these VMs at the start of the competition.

You will need the following software to use the provided virtual machine:

- For Windows/Linux: **VMware Workstation Player** version 16 or higher
- For Mac: **VMware Fusion Player** version 12 or higher

This software can be downloaded for free at **vmware.com**. No other software is required, as everything else is bundled within the respective virtual machines. Please also read the section about the **Demo VMs** further down below.

Rules

Please be aware of the following competition rules to guarantee a fair experience for every participant:

- The competition has a fixed start and finish time. It is up to yourself to decide how to best divide your time. Please do not forget that you will also need a couple minutes to review and submit your grading materials.
- Due to the competition allowing for BYOD (bring your own device), this exam is meant to be treated as open book, meaning that all resources including the internet are allowed. You are however NOT allowed to communicate with other people, including fellow candidates.
- You may not disclose any competition material or information to any other person, neither before, during nor after the competition.

Rating

The competition document with all tasks, which will be distributed to you on the day of the event, will contain the maximum number of points reachable per category. You can then decide yourself based on your knowledge and experience which tasks you will focus on first.

The grading process itself is done using automated scripts to collect the required data for marking which will then be analyzed by experts in the weeks after the competition. We focus on functional tests wherever possible, as we do not want to punish alternative/creative solutions and rather care that your setup works!

Technologies

The competition will make use of the following technologies. While most of the tasks focus on basic configurations, there are some optional challenge tasks available as well in case you have some time left to spare.

- **Network (Cisco Packet Tracer 8):** VLANs, basic IP routing, dynamic routing using OSPF, IPv4 and IPv6, spanning tree protocol, NAT
- **Windows (Server 2019 Standard Edition):** Active Directory, DNS Server, basic GPO usage, File Sharing, IIS Web Server
- **Linux (Debian 11 Bullseye):** Web Server (Apache), DNS Server (BIND9), FTP Server (ProFTPD), File Server (Samba), SSH Server (OpenSSH)

Example Tasks

You can find example tasks based on an older championship including a demo exam on www.ict-berufsbildung.ch, specifically under this link: https://www.ict-berufsbildung.ch/resources/2020_regio_preparation-Trade39.pdf

Demo VMs

What is the Demo VM?

To guarantee that participants will not run into any issues at the start of the competition with the provided virtual machines, two demo virtual machines are available for download. While they do not contain any of the actual tasks, they have exactly the same base setup and provide you with a means of testing if the final Windows and Linux VMs are going to work or not.

Download Instructions

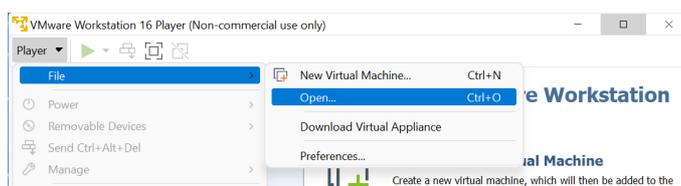
You can download the two demo VMs here, which are both bundled into their own dedicated ZIP file and can be extracted to any folder of your choice. VMware will automatically place them at a different location during import, so you might as well extract the ZIP file within your Downloads folder.

The demo VMs are stored on the ICT-Berufsbildung Schweiz share and can be downloaded from this URL: https://ictbb-my.sharepoint.com/:f:/g/personal/info_ict-berufsbildung_ch/Evtha7_gsWpFhVLloSXbhGwBCcouexadvQmcSoFPYachyg?e=FzBGfv
Please navigate to the “Demo VMs” folder to find the two VM archives.

VMware Setup Guide

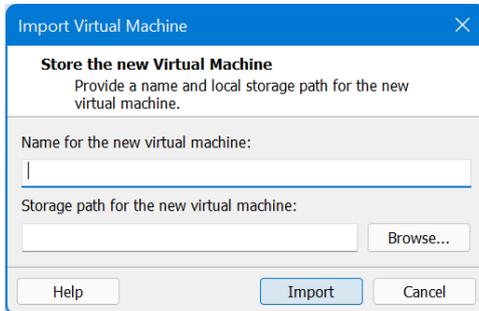
After installing one of the VMware products mentioned earlier (see section “Bring your own device”), you will have to import both virtual machines. The following text documents the process for VMware Workstation, but it is similar for VMware Fusion Player.

Start by navigating to “File → Open...” and select the OVF file of the virtual machine you want to import.



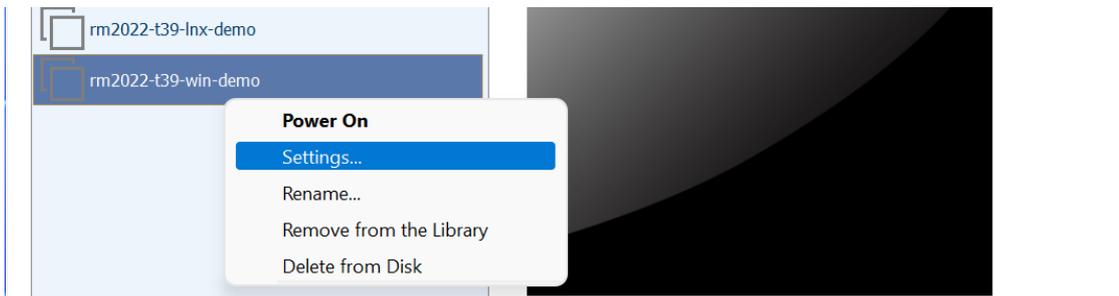
After selecting the file, you will see a second dialog asking you for your desired name and import location. While you can customize these settings to your liking,

you may as well leave them empty to keep the defaults and continue by clicking on the “Import” button:



This will take a short moment as the downloaded VM is now copied to the appropriate location, meaning that after this process the original files in the Downloads folder are no longer needed.

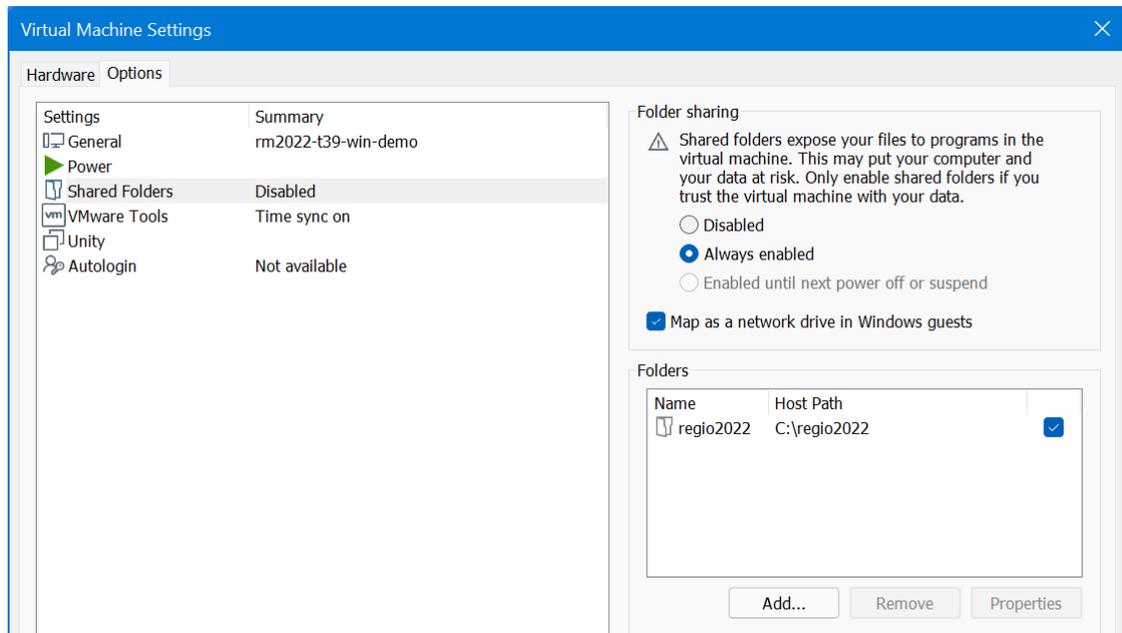
With this being done, you must enable shared folders on the virtual machine. To do so, right click on the virtual machine and choose “Settings...”:



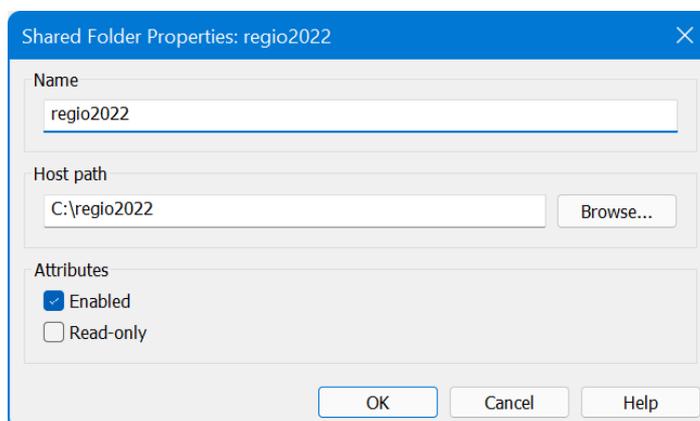
You will then see a new dialog open where the VM configuration is being presented. Do not change anything on the “Hardware” tab and proceed to the “Options” tab instead, followed by clicking on “Shared Folders”.

You must now tick the option **“Always enabled”**. Additionally, on the Windows virtual machine, you must also tick the option **“Map as a network drive in Windows guests”**.

Additionally, select the “regio2022” entry in the “Folders” section and click on “Properties” to double-check and adjust the format on your host machine if needed. You must manually create this folder, e.g. when using the default configuration you must create the directory “C:\regio2022”!



The screenshot above shows the properly configured shared folder for the Windows VM, the screenshot below shows the “Properties” dialog where the folder is mapped. Also make sure that **read-only** is unticked, although this should usually be the default setting.



With this being done, the VM has been successfully imported into VMware and is now ready to be used. Please repeat this process for the other VM as well (e.g. if you imported the Windows VM, now import the Linux VM) before proceeding with the next section.

Failure to properly map the shared folder will make grading your setup impossible in the competition, so be sure to verify this!

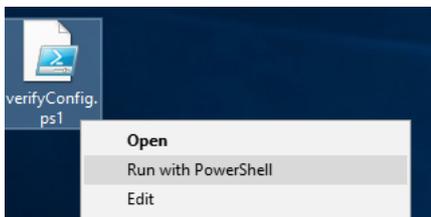
Test the Windows VM

Launch the Windows VM within VMware and enter the password for the full-disk encryption, which is **regio2022** for the demo virtual machine. This password must be entered on this screen:

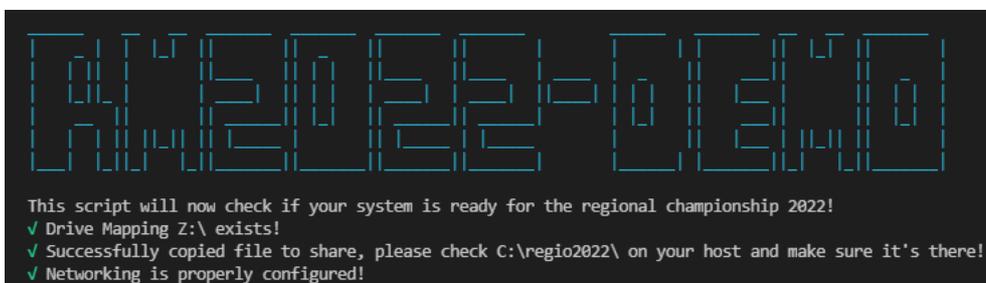


After entering the correct password, you should be able to login using the **“Administrator”** account with the password **“Regio2022\$”**. You can now check how the virtual machine performs on your setup and ensure that there are no obvious issues with running the machine.

To check the shared folder setup, you can launch the predeployed PowerShell script **“verifyConfig.ps1”** which is stored on the desktop.

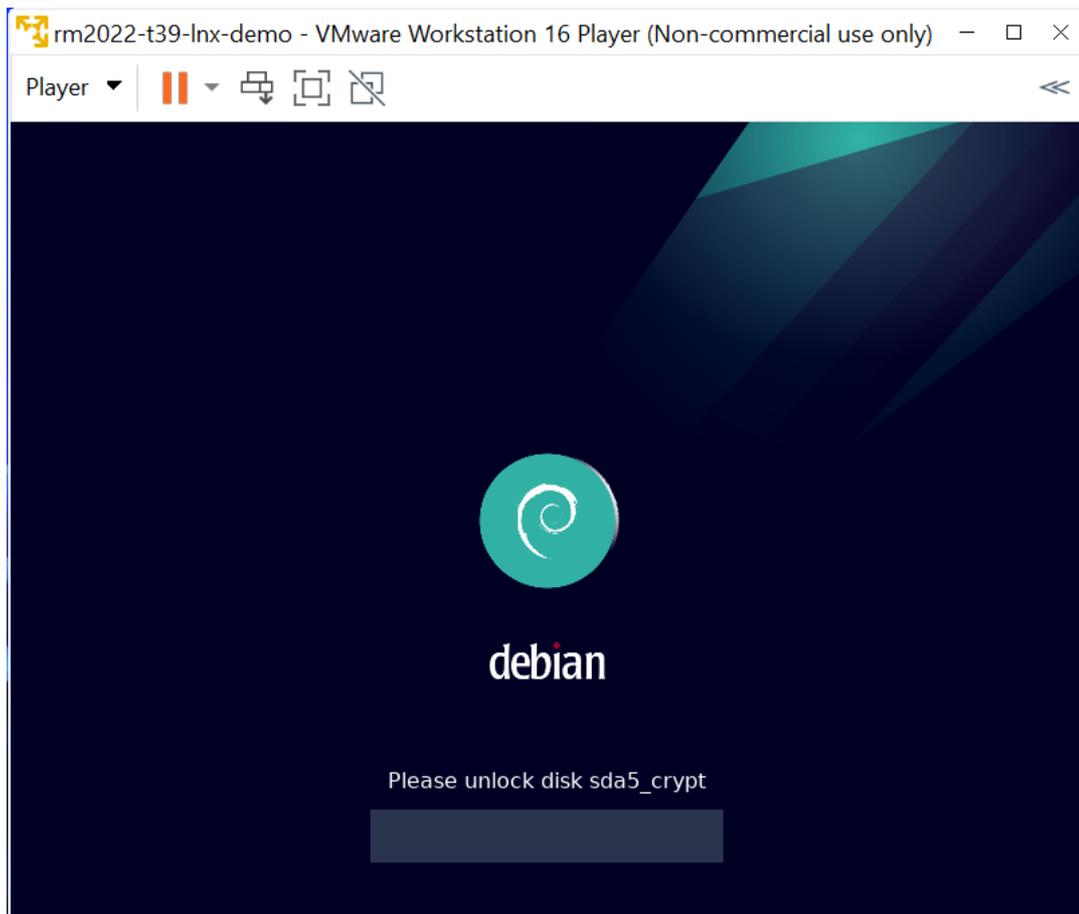


It should not output any errors and look like this:



Test the Linux VM

Launch the Linux VM within VMware and enter the password for the full-disk encryption, which is **rm2022** for the demo virtual machine. This password must be entered on this screen:



You should then be automatically signed into the user account “candidate”, but if something goes wrong the password for this account as well as “root” is **“Regio2022\$”**. Please start by testing if you can access the shared folder – to do so, execute these commands in order:

- `cd /mnt/hgfs/regio2022`
- `echo “$(date)” > test`
- `touch test2`
- `rm test2`

If all these commands work without any errors and you see a “test” file with a date/time written into it on your host machine, you’re all set. As a reminder, you

have to look at the path which has been previously configured within VMware, e.g. “C:\regio2022” if using our default configuration.

This year we also introduced a stripped down XFCE4 desktop environment, which can be launched using the CLI command “startxfce4”. You can simply type this command while being logged in as the “candidate” account and are then provided with a fully-functional desktop where you can launch multiple terminals including clipboard and mouse support.

We see this as a fair trade-off, as even though Linux servers usually have no GUI, in a real-life scenario you are most likely to only configure the network and then proceed with the setup on your own machine using SSH. You are not obliged to use this environment, but due to the default framebuffer being quite lacking we certainly recommend it.

You do not have to memorize this command or hint – it will be also provided to you in the competition document you receive on the day of the event.

Future of trade 39

As you might already know, this will most likely be the last regional competition in trade 39. By scoring a good result, you may qualify yourself for the brand-new trade 53 in Cloud Computing, which will have its first national championship hosted at SwissSkills 2022.