Instruction – using AWS

Table of Contents

1. Connection with AWS virtual machine

1.1. Open ssh tunnel for port 5901

To open ssh tunnel type the following command into the command prompt:

```
ssh -N -L 5901:localhost:5901 hackathon_fpga@<SERVER_IP> -i <path_to_ssh_key>
```

Server IP and path to ssh key “SSH_Key_Team” should be provided in email.

Logging in is done with user “hackathon_fpga”, to open additional terminal (if needed) use:

```
ssh hackathon_fpga@<SERVER_IP> -i <path_to_ssh_key>
```

*If there is problem with key permissions on Windows - open cmd and use commands:

```
icacls <SSH_KEY_PATH> /inhritance:r
icacls <SSH_KEY_PATH> /grant:r "%username%":"(R)"
```

*If there is problem with key permissions on Linux - open terminal and use command:

```
chmod 600 <SSH_KEY_PATH>
```

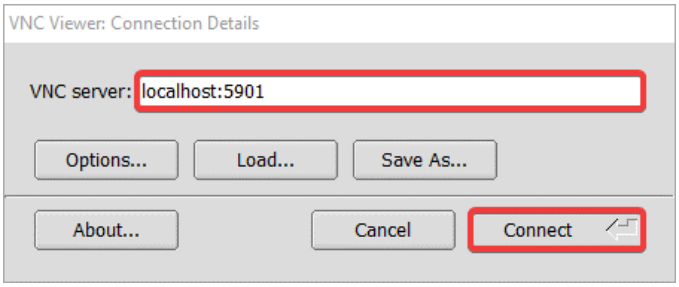
1.2. Connect with AWS virtual machine using TigerVNC (TBD)

TigerVNC Viewer can be downloaded from the official site https://tigervnc.org/

Select “Releases”, then, after redirection to gitlab, select version which you want, there will be links to binaries. If newest 1.12 version will not work, select version 1.11.0.

After installing the program run it and provide the parameter:

- VNC server: localhost:5901



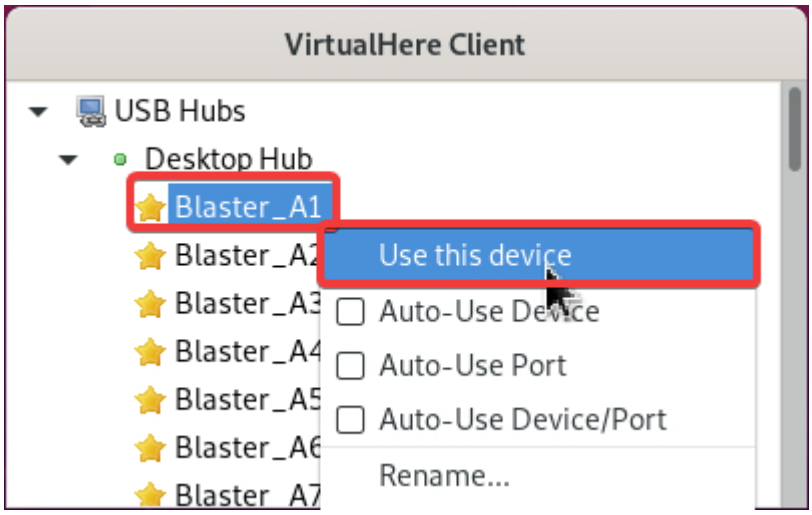
The connection is using the user hackathon_fpga (password: fpga2022). After logging in, the system should be ready to work.

2. Connection with board

The connection to the fpga device is done using the VirtualHere program. To use the VirtualHere client, run the vhuit64 file from desktop as a superuser:

```
sudo ./vhuit64
```

After the program is loaded, a list of available devices will appear. There is possibility to connect to the selected device by double-clicking with the left mouse button, or by selecting "Use this device" after clicking the right mouse button. A password for device is required to establish a connection. Password which is 12 first characters of the 5th line in the team ssh private key file.

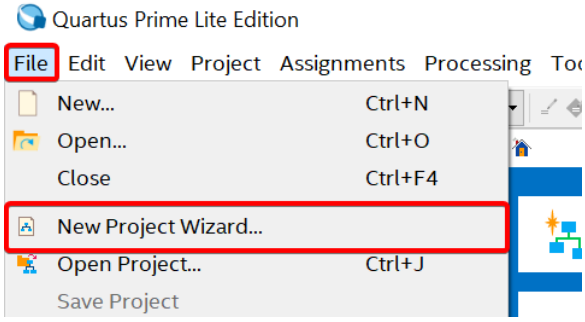


It is possible to use option “Remember”. If the remembered password was entered incorrectly, it can be canceled by selecting device and using shortcut Shift+F9.

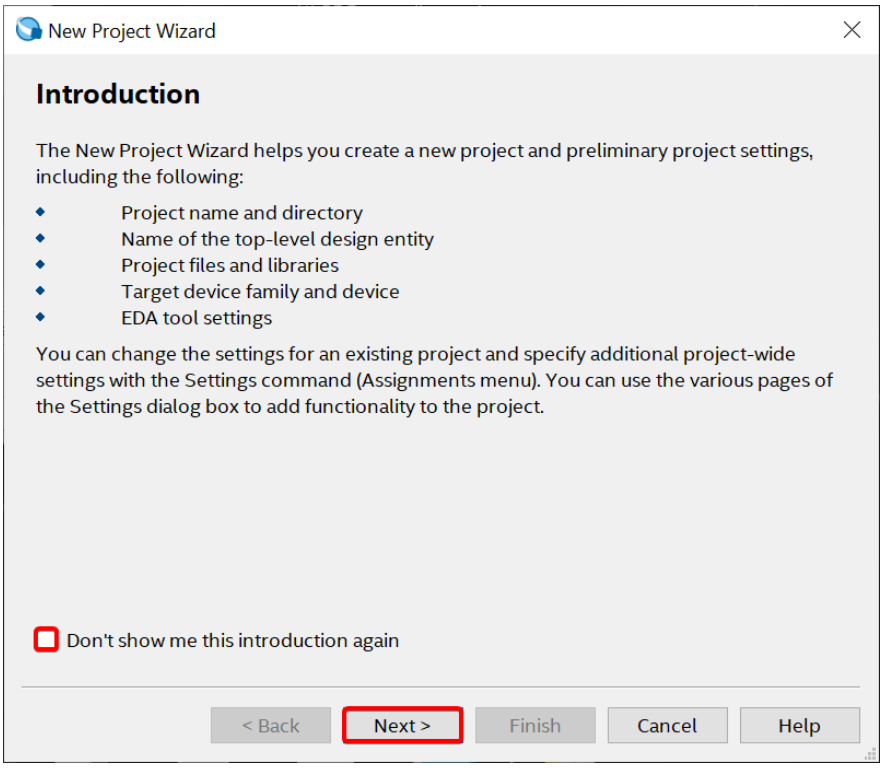
3. Upload bitfile

3.1. Create empty project *(for connection test)*

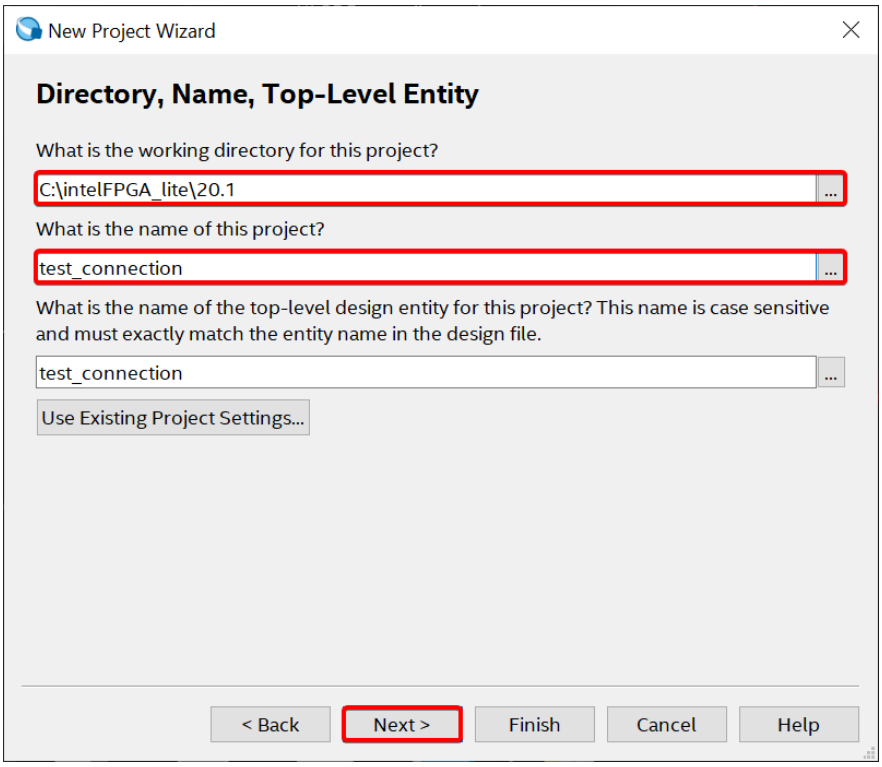
Select “New Project Wizard…” from “File” tab



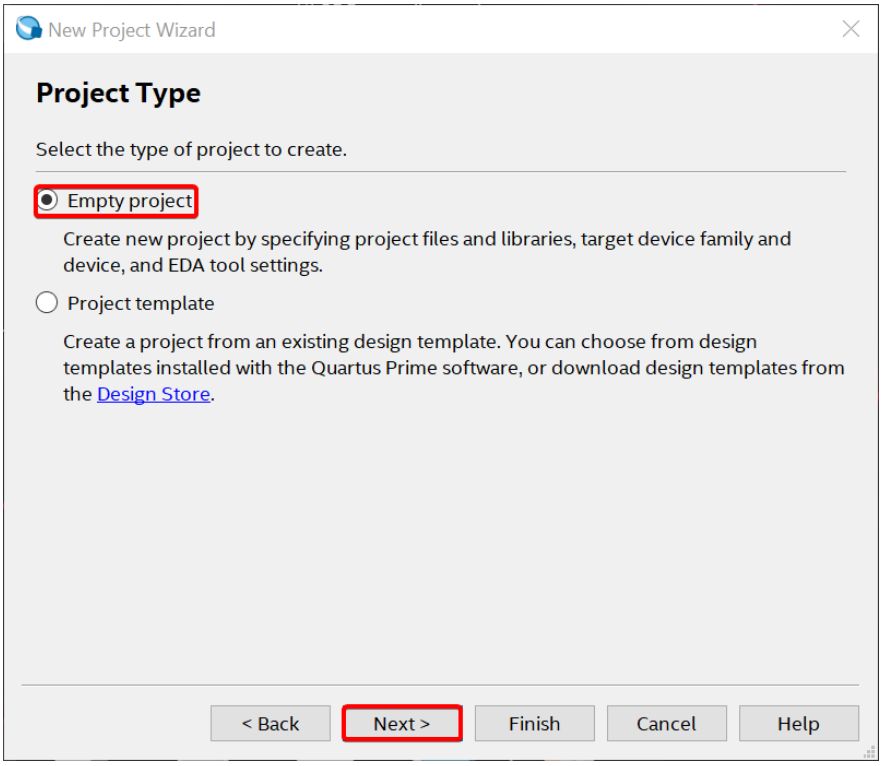
Select “Next” and check “Don’t show me this introduction again” if you don’t want to see this Introduction again



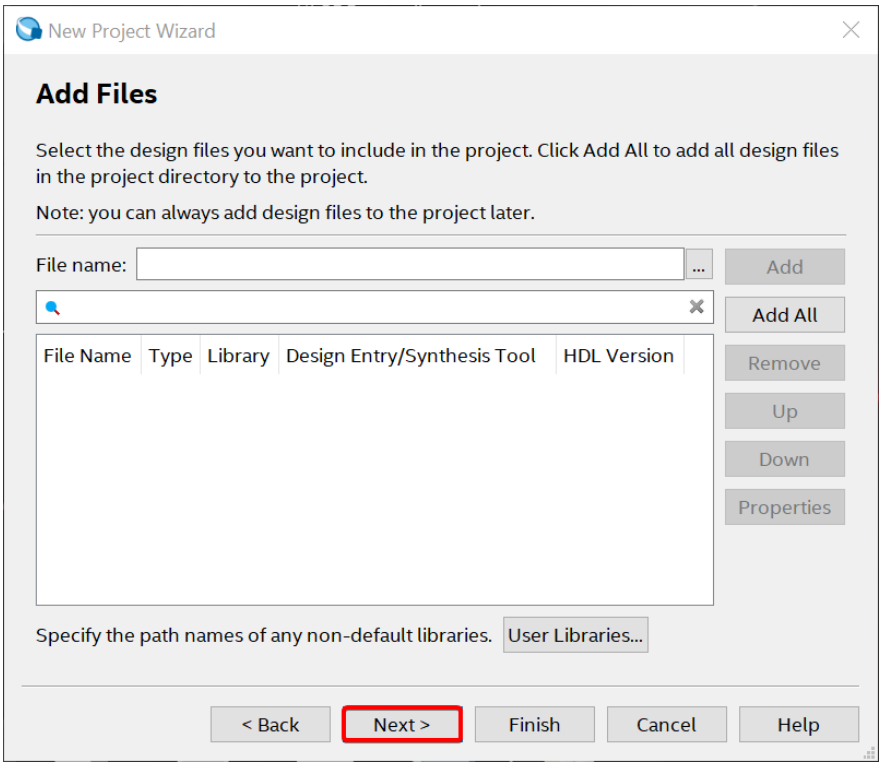
Enter correct project path and name



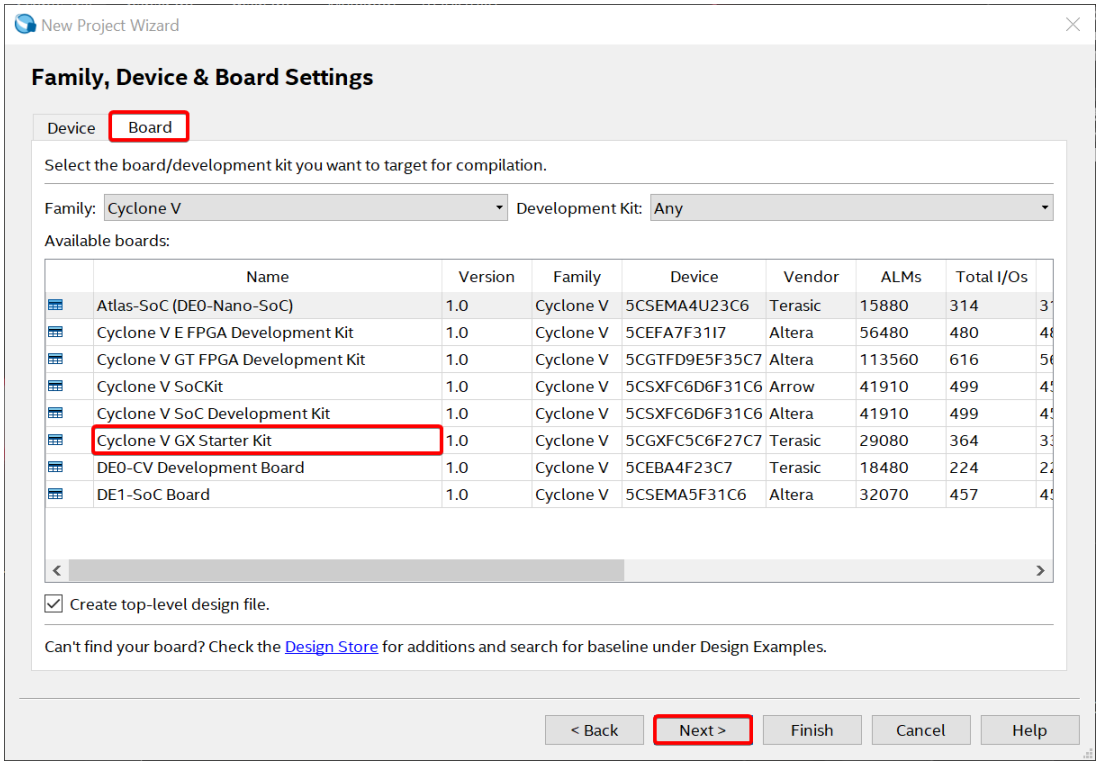
Select “Empty project”



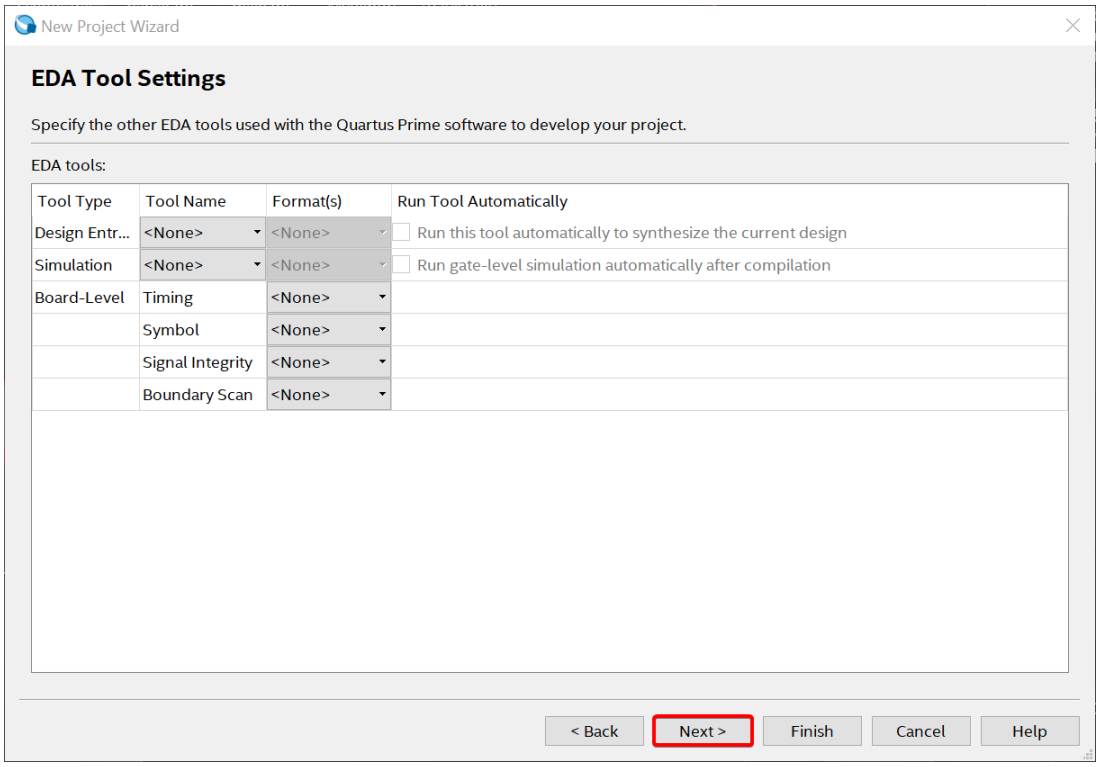
Additional files are not needed



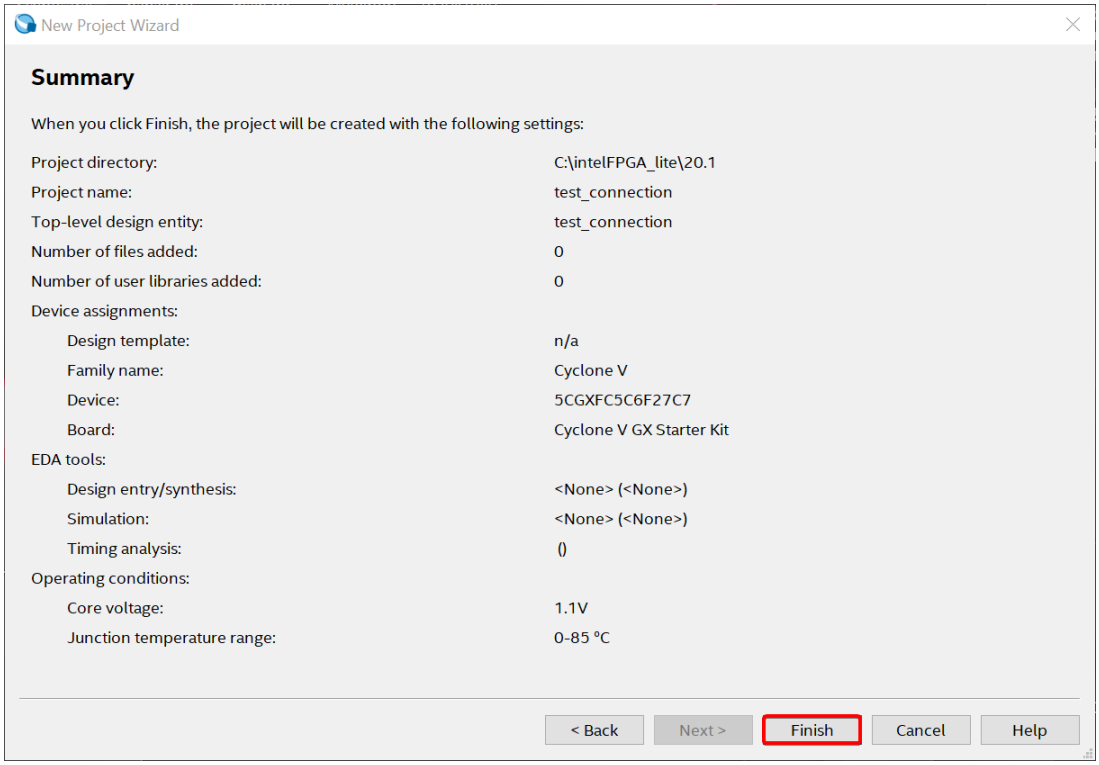
Select “Board” and “Cyclone V GX Starter Kit”



For empty project nothing is needed here

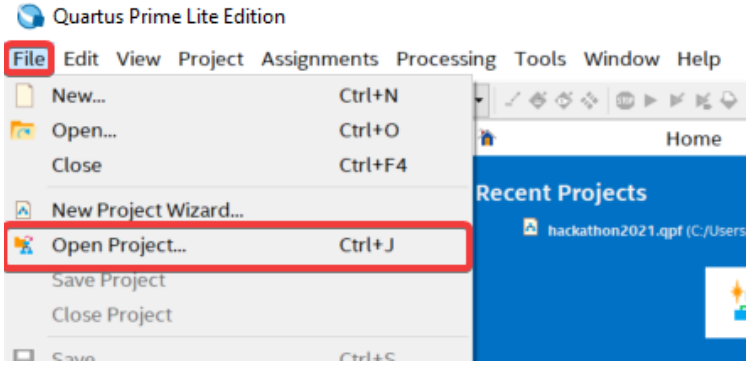


Select “Finish” to create empty project

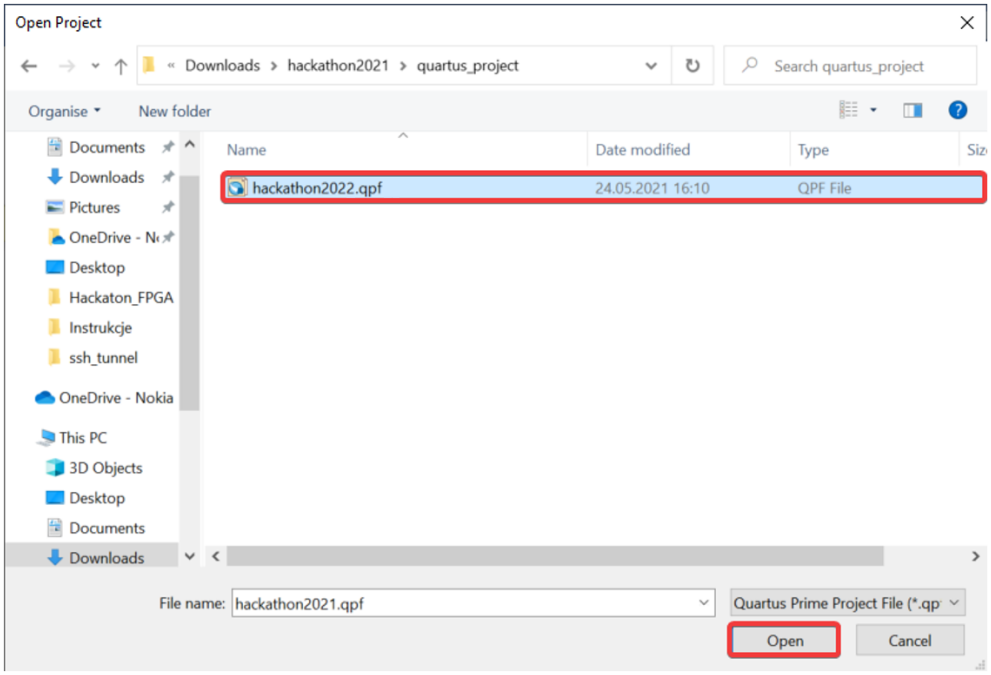


3.1. Import project

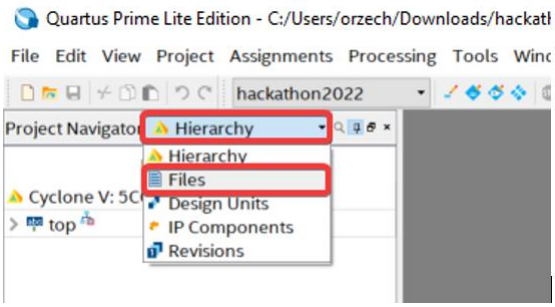
Select “Open Project” from “File” tab.



Enter the path to project (*.qpf file from “quartus_project” directory)

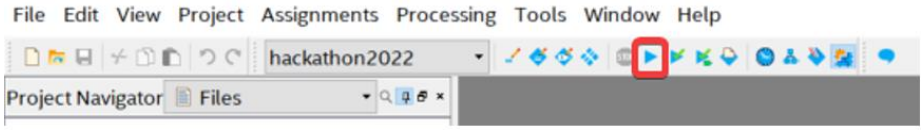


To see all files from project change view from “Hierarchy” to “Files”

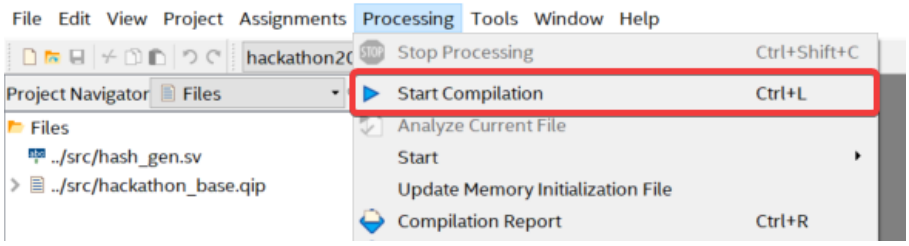


3.3. Compilation

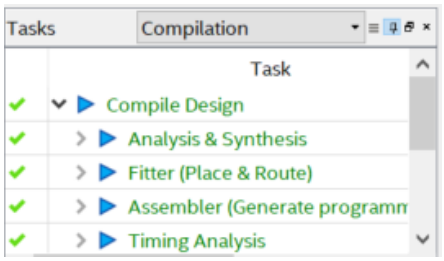
To compile project use button with triangle from tool bar



Or select “Start Compilation” from Processing tab



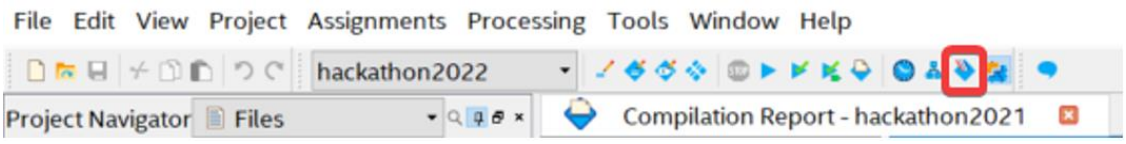
If compilation was successful all compilation phases should have green color



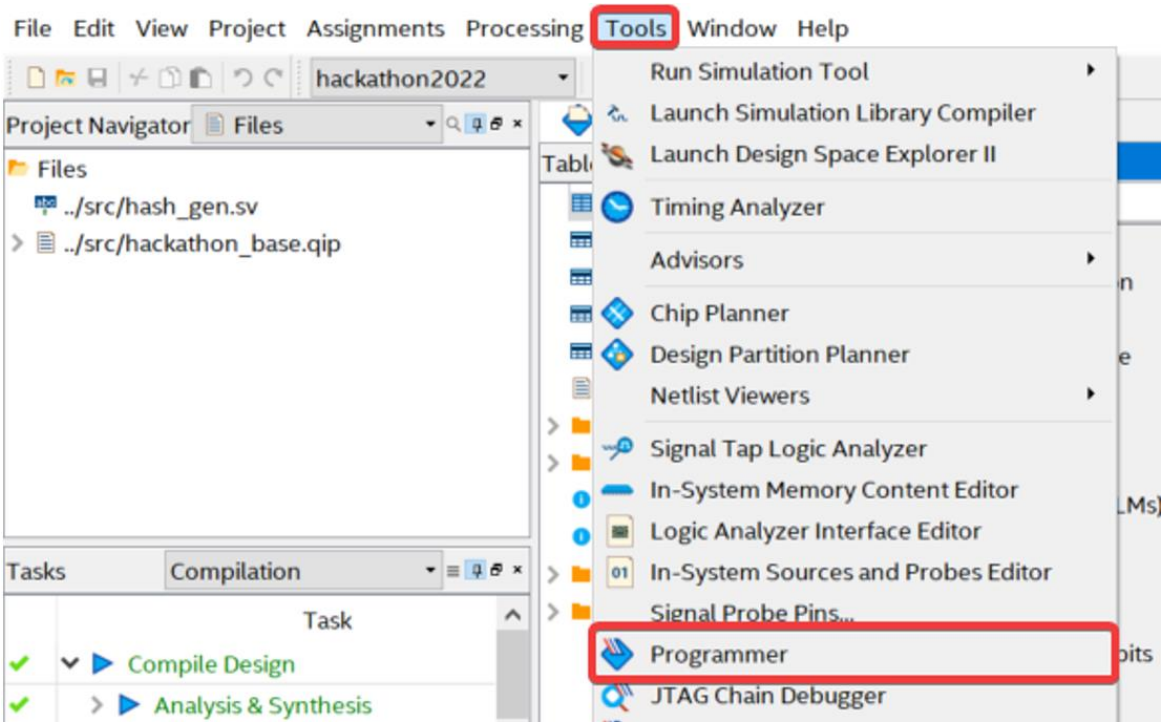
3.3. Uploading bitfile

To upload bitfile right usb device should be connected via virtualhere.

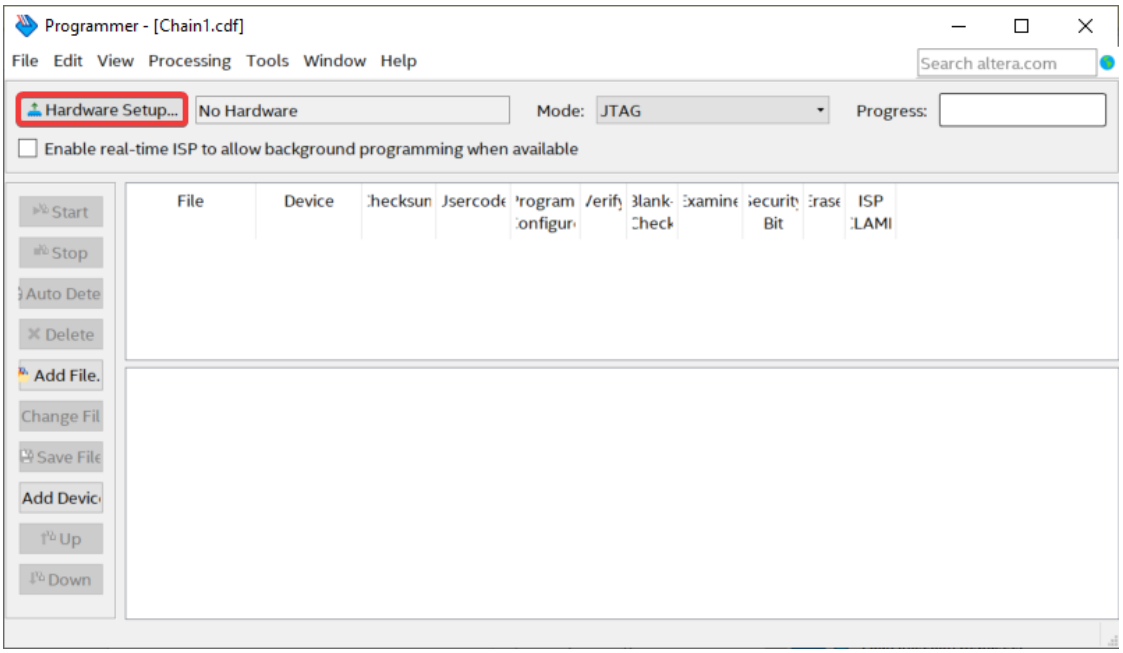
Run Programmer using symbol shown on picture below



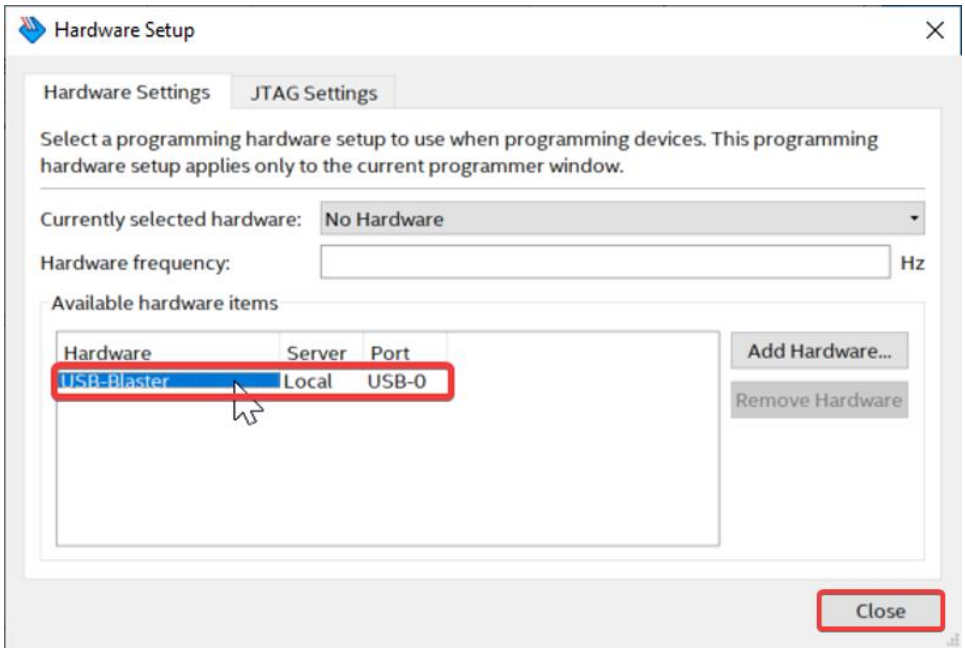
Or select “Programmer” option from “Tools” tab.



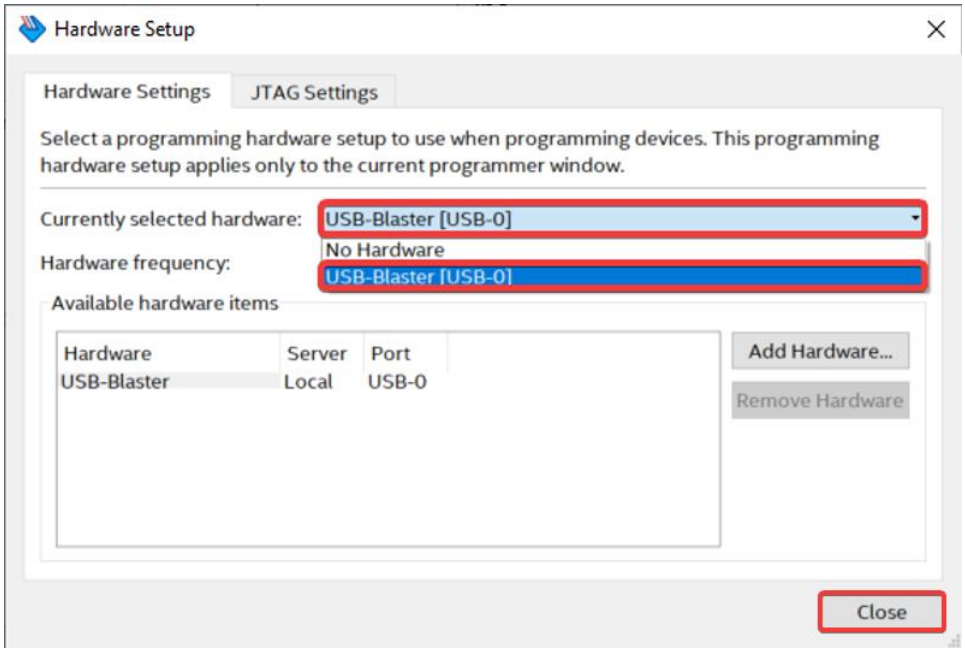
If “USB-Blaster” is not connected select “Hardware Setup”



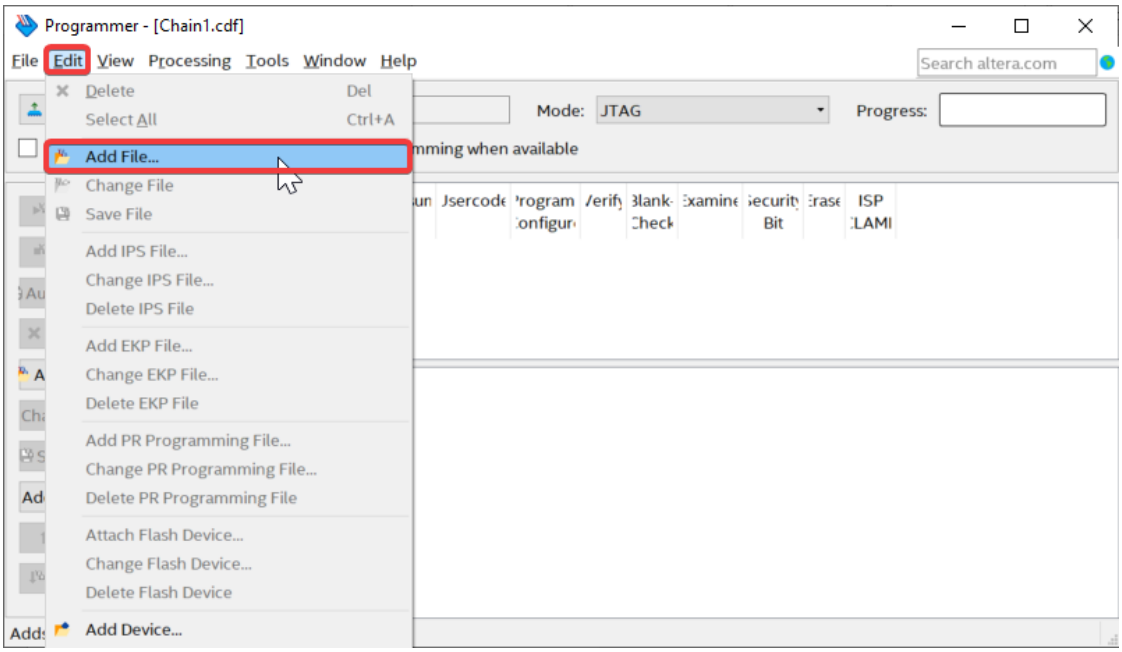
Double click on USB-Blaster connected



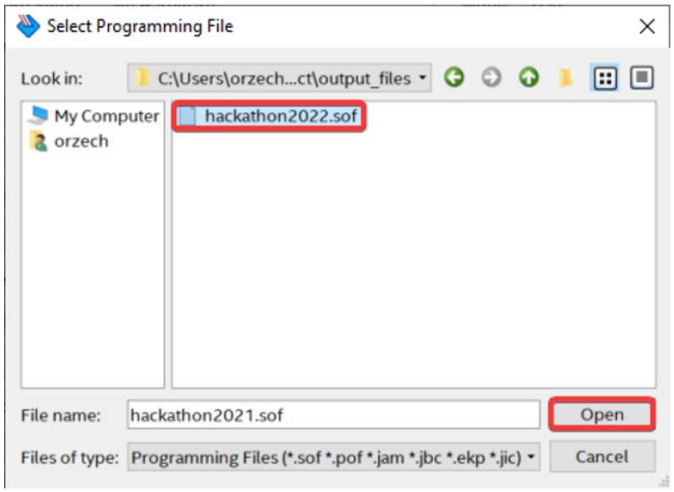
Or select USB-Blaster from drop-down list



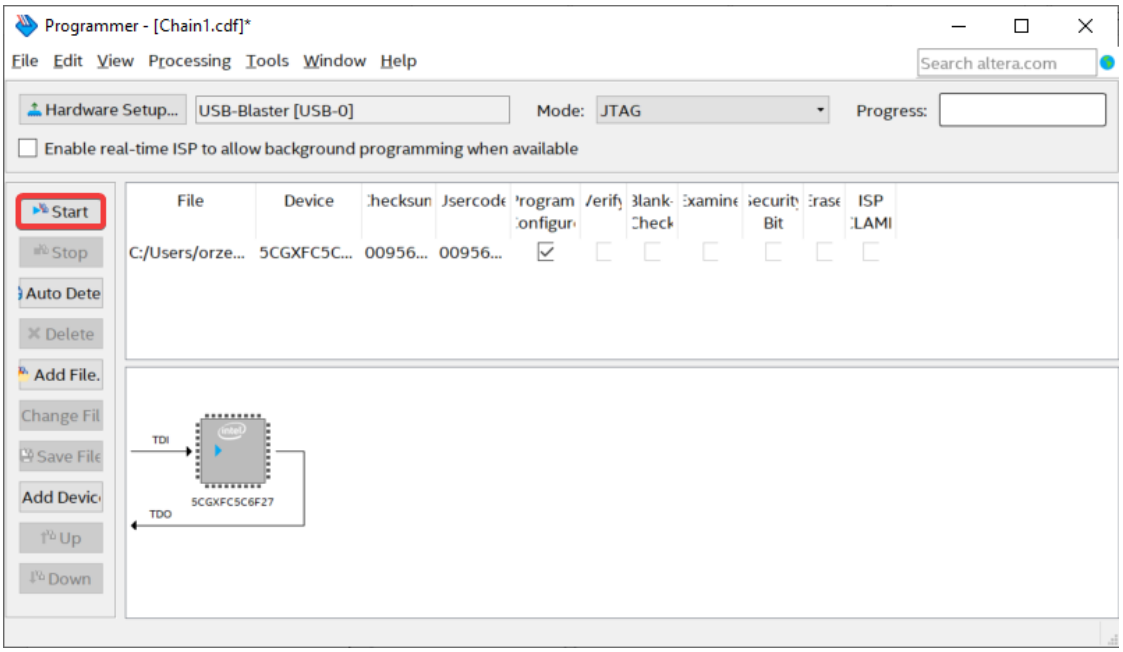
If there is need to choose bitfile expand “Edit” from toolbar and select “Add File”



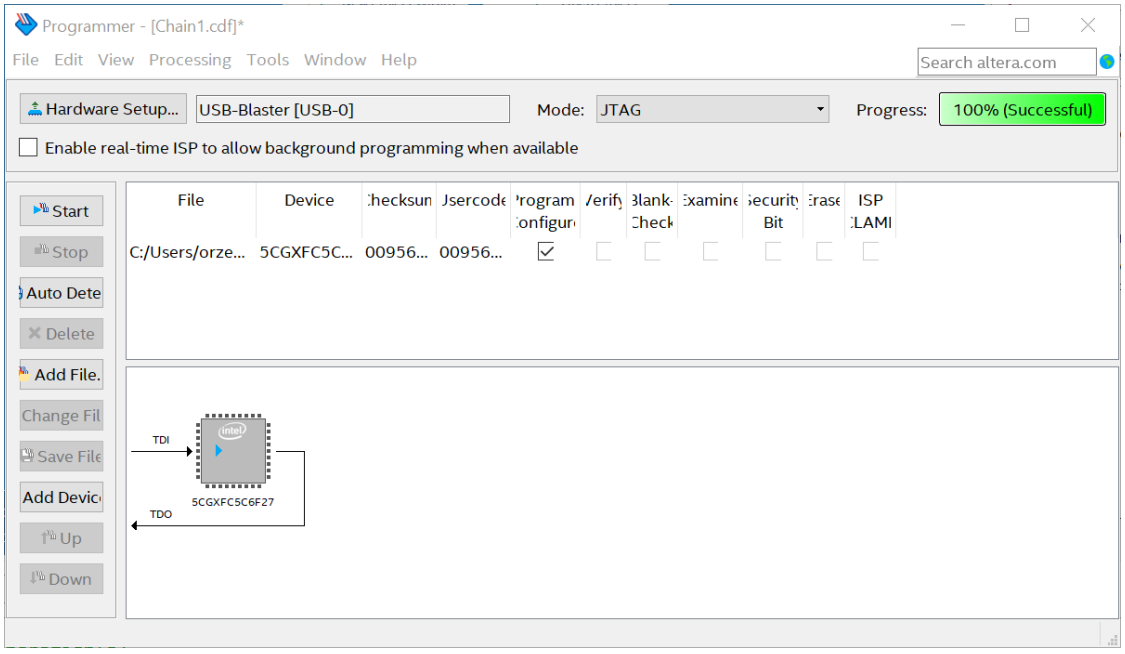
And select bitfile (file *.sof from “output_files” directory)



Use “Start” button to upload bitfile



If everything works bitfile will be uploaded with 100% Success



Sometimes it takes a while, so if “Progress” bar looks stuck - be patient.

If upload bitfile fails close programmer, use command below and try upload bitfile again

```
sudo killall jtagd
```

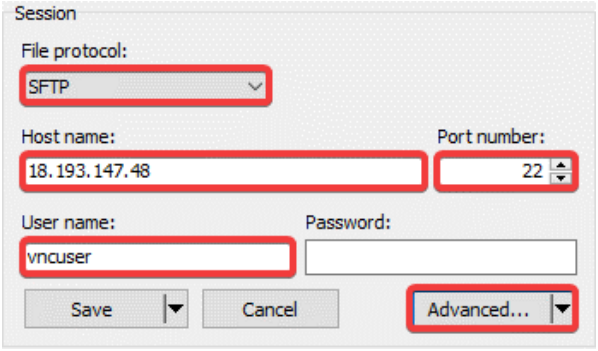
4. Additional actions

4.1. File transfer

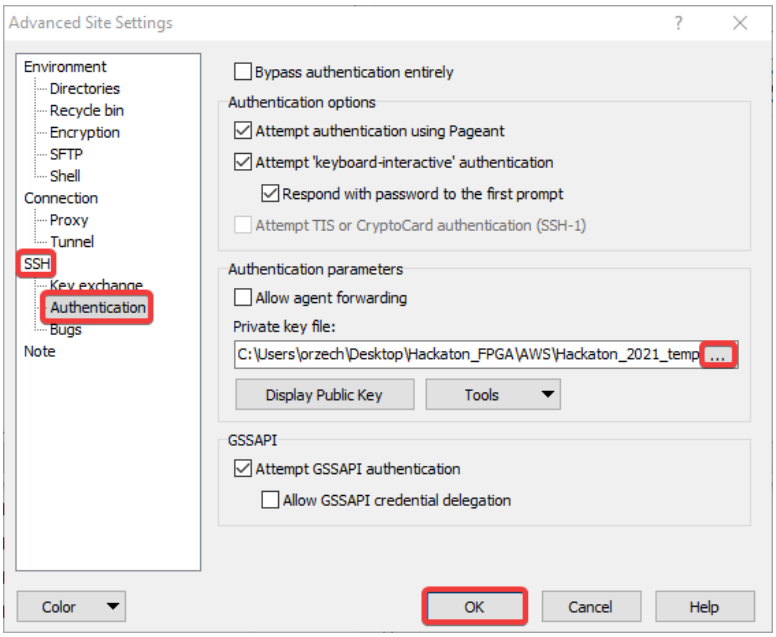
Files can be transferred using WinSCP (or another software). If you using WinSCP required parameters are:

- File protocol: SFTP
- Host name: SERVER_IP (Delivered with mail)
- Port number: 22
- User name: vncuser

Then go to Advanced settings



In the SSH / Authentication tab, enter the path to the ssh key “SSH_Key_Team”



After the configuration save changes and connect to transfer files with the virtual machine.