



UNIMORE
UNIVERSITÀ DEGLI STUDI DI
MODENA E REGGIO EMILIA

Dipartimento di Scienze Fisiche,
Informatiche e Matematiche

Appendix 2 HLS - FPGA Tools Installation

High Performance Computing [262-022]

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Corso di Laurea in INFORMATICA

(D.M.270/04) [16-262]

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Ambiente di sviluppo

- *PC con uno dei seguenti sistemi operativi installati o in alternativa una macchina virtuale:*
 - *Ubuntu 16.04.5, 16.04.6, 18.04.1, 18.04.2, 18.04.3, 18.04.4*
 - *Windows 10*
 - *Altre distro Linux (Red Hat, CentOS, Suse)*
- *Almeno 16 GB di RAM, eventualmente abilitando anche lo swap.*
- *Ambiente di sviluppo Vitis 2020.1*
- *Un account registrato su xilinx.com*

Ambiente di sviluppo (cont.)

- **Vivado HLS**: *tool di High Level Synthesis, permette di tradurre un programma C/C++ in un modulo Verilog/VHDL;*
- **Vivado**: *design hardware;*
- **Vitis**: *programmazione software;*



Installazione

→ *Scaricare vitis 2020.1 dal seguente link:*

<https://cloud.hipert.unimore.it/s/AZbjsSiGdHH8SZ9/download>

→ *Far partire l'installer di vitis:*

→ `$ chmod +x Xilinx_Unified_2020.1_0602_1208_Lin64.bin`

→ `$./Xilinx_Unified_2020.1_0602_1208_Lin64.bin`

Installazione

Xilinx Unified 2020.1 Installer - Select Install Type

Select Install Type

Please select install type and provide your Xilinx.com user ID and password for authentication.

User Authentication

Please provide your Xilinx user account credentials to download the required files.
If you don't have an account, [please create one](#). If you forgot your password, you can [reset it here](#).

User ID

Password

Download and Install Now

Select your desired device and tool installation options and the installer will download and install just what is required.

Download Image (Install Separately)

The installer will download an image containing all devices and tool options for later installation. Use this option if you wish to install a full image on a network drive or allow different users maximum flexibility when installing.

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< Back Next > Cancel

→ Inserire username e password generati su xilinx.com;

→ L'username è l'indirizzo mail.

Installazione

Xilinx Unified 2020.1 Installer - Accept License Agreements

Accept License Agreements 

Please read the following terms and conditions and indicate that you agree by checking the I Agree checkboxes.

Xilinx Inc. End User License Agreement

By checking "I Agree" below, or OTHERWISE ACCESSING, DOWNLOADING, INSTALLING or USING THE SOFTWARE, I AGREE on behalf of licensee to be bound by the agreement, which can be viewed by [clicking here](#).

I Agree

WebTalk Terms And Conditions

By checking "I Agree" below, I also confirm that I have read [Section 13 of the terms and conditions](#) above concerning WebTalk and have been afforded the opportunity to read the WebTalk FAQ posted at <https://www.xilinx.com/products/design-tools/webtalk.html>. I understand that I am able to disable WebTalk later if certain criteria described in Section 13(c) apply. If they don't apply, I can disable WebTalk by uninstalling the Software or using the Software on a machine not connected to the internet. If I fail to satisfy the applicable criteria or if I fail to take the applicable steps to prevent such transmission of information, I agree to allow Xilinx to collect the information described in Section 13(a) for the purposes described in Section 13(b).

I Agree

Third Party Software End User License Agreement

By checking "I Agree" below, or OTHERWISE ACCESSING, DOWNLOADING, INSTALLING or USING THE SOFTWARE, I AGREE on behalf of licensee to be bound by the agreement, which can be viewed by [clicking here](#).

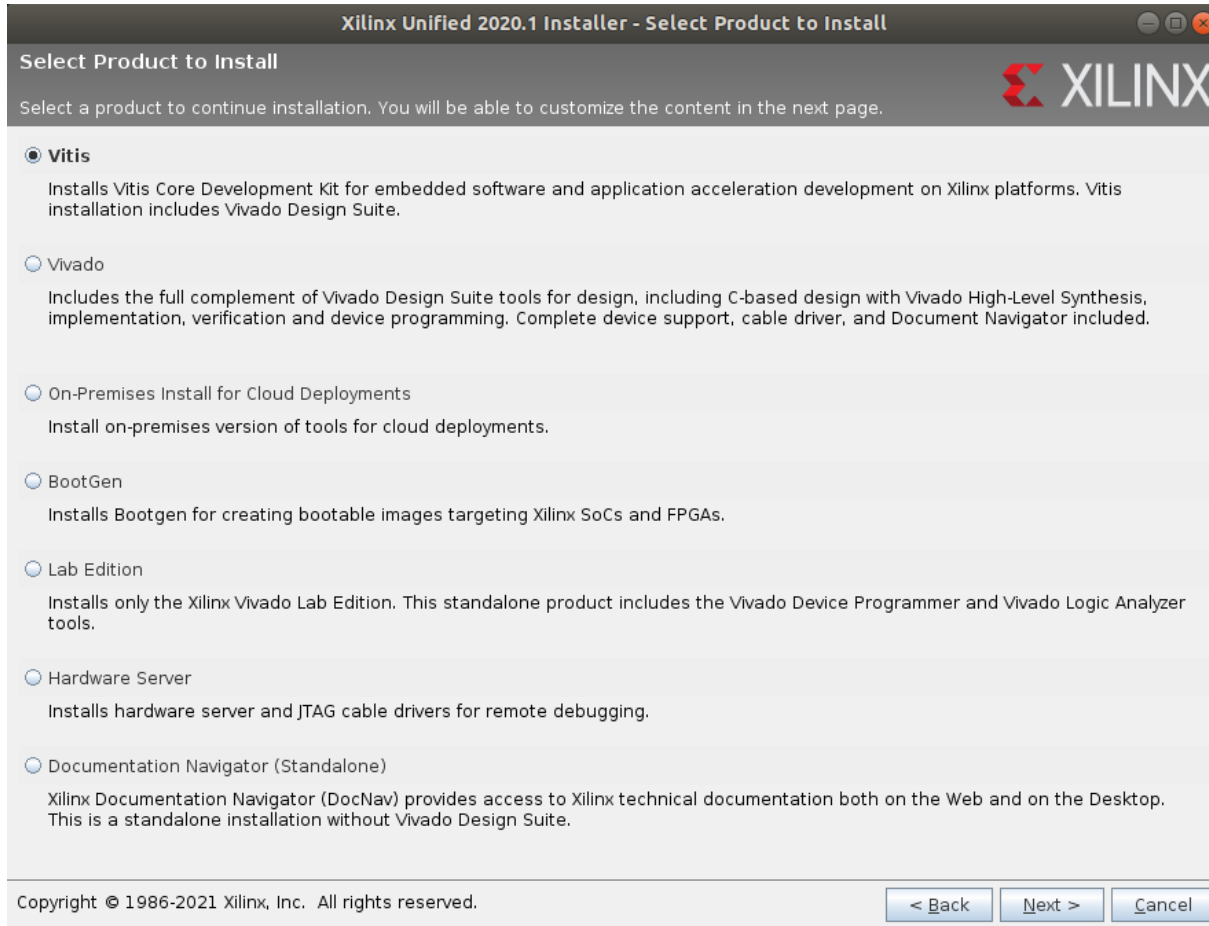
I Agree

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< Back Next > Cancel

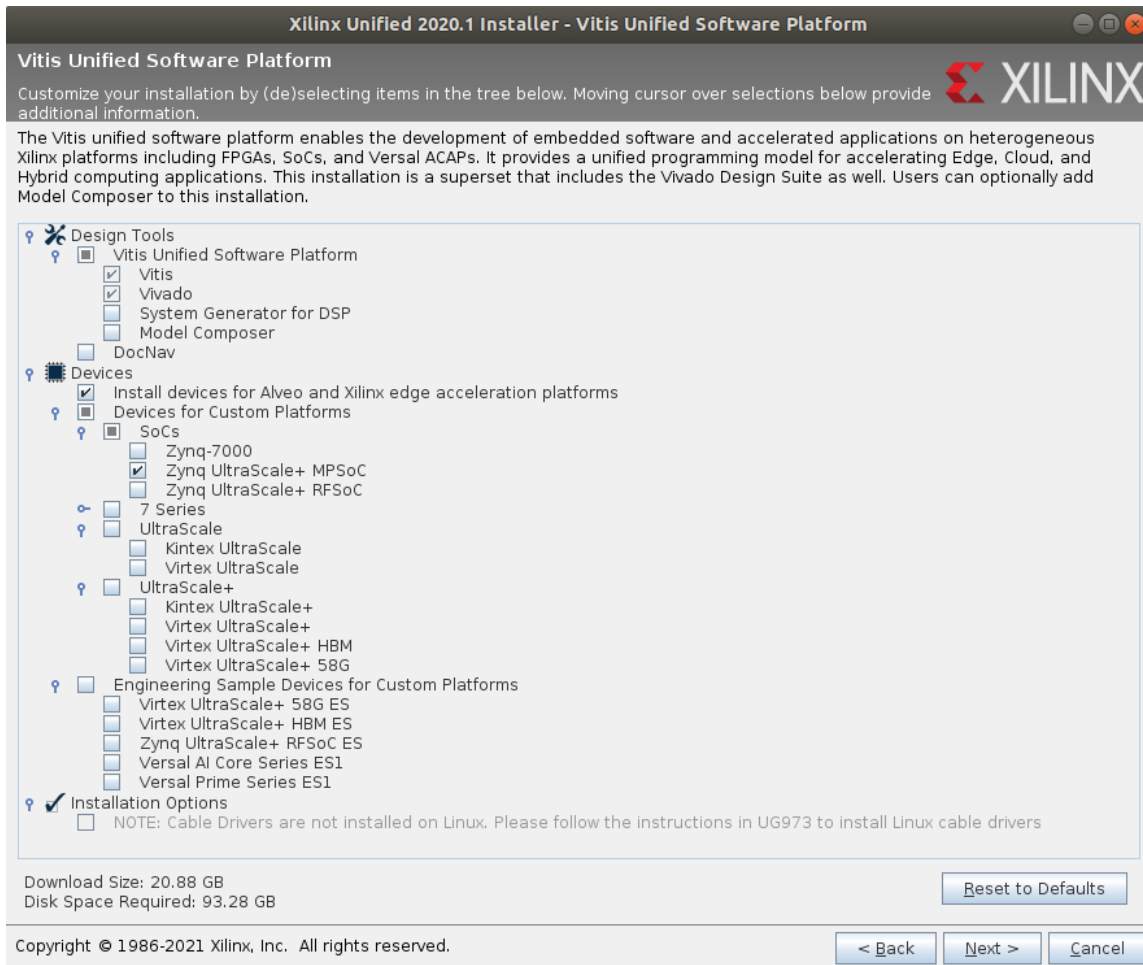
→ Mettere il flag sulle licenze.

Installazione



→ Assicurarsi di aver selezionato «Vitis»

Installazione

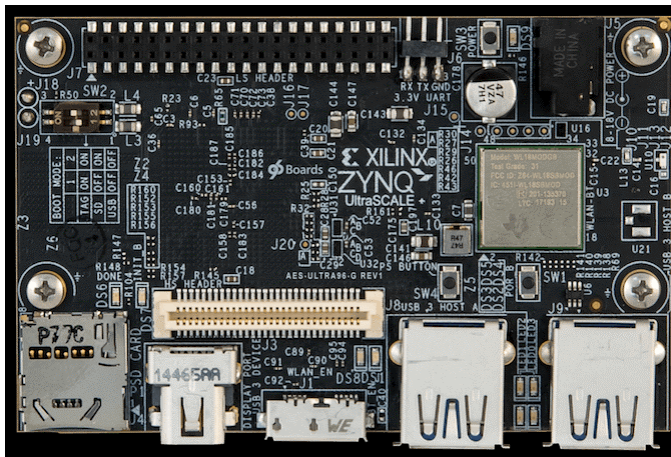


→ *Lasciare solamente i seguenti flag, in modo da ridurre lo spazio necessario;*

→ *Assicurarsi di avere almeno 95GB liberi sul disco, per l'installazione.*

Piattaforma di sviluppo

→ Avnet Ultra96v2



→ Zynq UltraScale+, SoC ZU3EG:

→ CPU:

→ quad-cores ARM Cortex A53

→ dual-cores ARM Cortex R5F

→ GPU:

→ ARM Mali 400 (solo grafica)

→ 16nm FPGA



Installazione Avnet Ultra96

→ *Clonare i files di configurazione della board:*

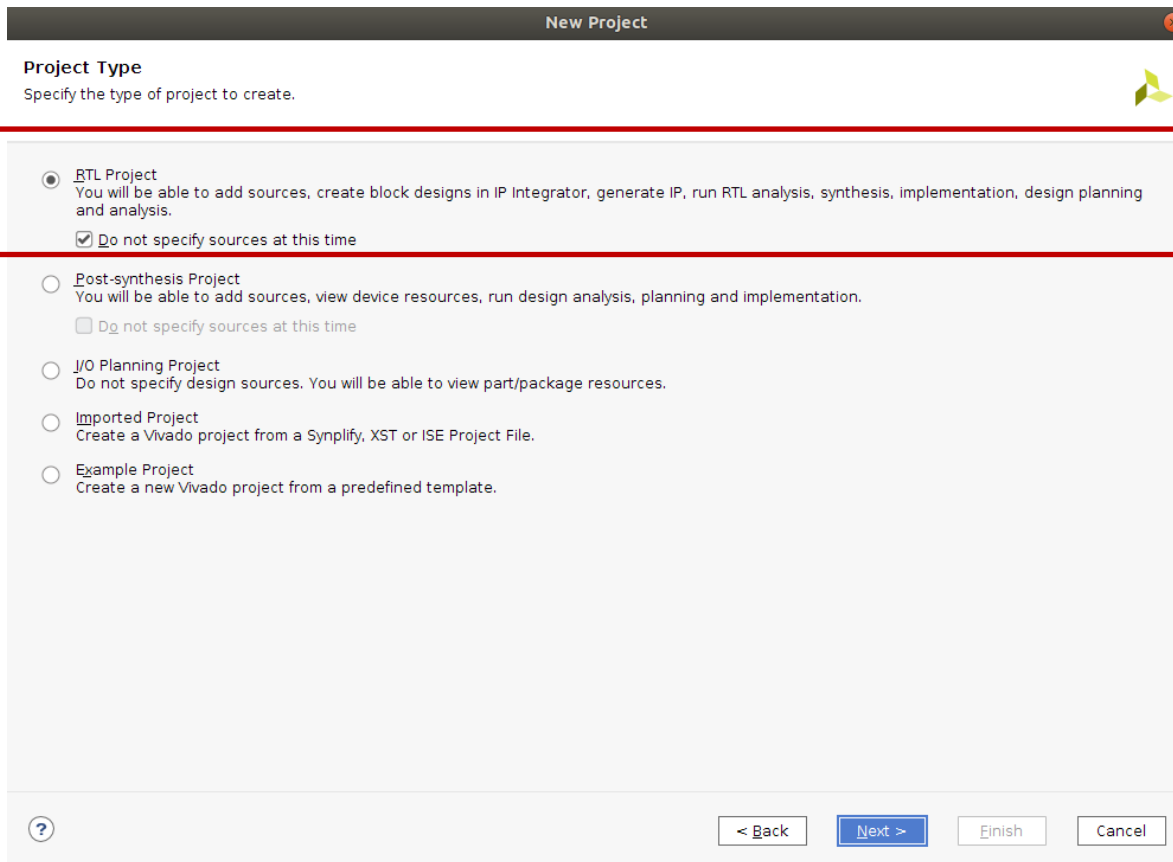
→ `$ git clone https://github.com/Avnet/bdf`

→ `$ cd bdf`

→ `$ cp -r ultra96v2 /tools/Xilinx/Vivado/2020.1/data/boards/board_files/`

Installazione Avnet Ultra96

→ Verifichiamo se la piattaforma è stata installata correttamente:



→ Create Project

New

Installazione Avnet Ultra96

New Project

Default Part
Choose a default Xilinx part or board for your project.

Parts | Boards

Reset All Filters

Category: All Package: All Temperature: All
Family: All Speed: All Static power: All

Search: Q-

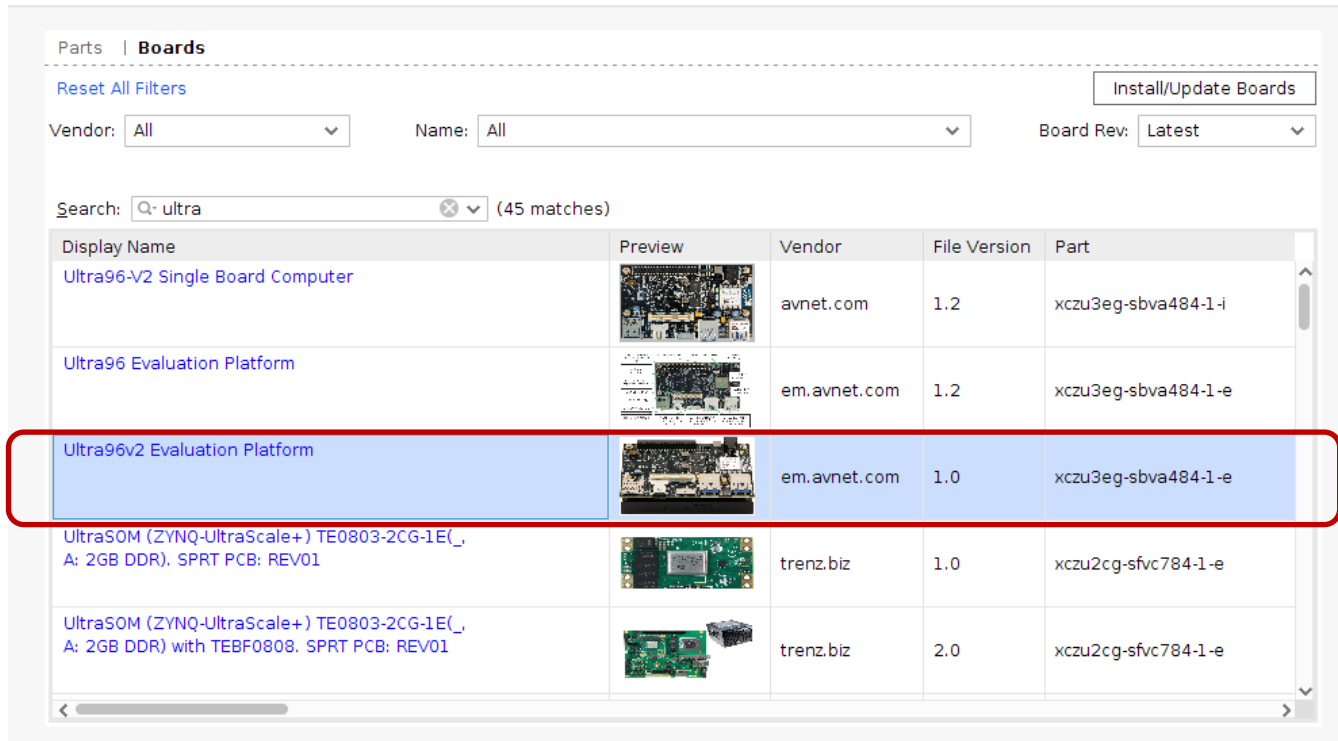
| Part | I/O Pin Count | Available IOBs | LUT Elements | FlipFlops | Block RAMs | Ultra RAMs | DSPs | Gb Transceivers | GTPE |
|-------------------------|---------------|----------------|--------------|-----------|------------|------------|------|-----------------|------|
| xcku115-flvf1924-1-c | 1924 | 728 | 663360 | 1326720 | 2160 | 0 | 5520 | 64 | 0 |
| xcku115-flvf1924-1-i | 1924 | 728 | 663360 | 1326720 | 2160 | 0 | 5520 | 64 | 0 |
| xcku115-flvf1924-1L-i | 1924 | 728 | 663360 | 1326720 | 2160 | 0 | 5520 | 64 | 0 |
| xcku115-flvf1924-1LV-i | 1924 | 728 | 663360 | 1326720 | 2160 | 0 | 5520 | 64 | 0 |
| xcvc1902-viva1596-3H... | 1596 | 422 | 899840 | 1799680 | 967 | 463 | 1968 | 32 | 0 |
| xcvc1902-viva1596-2H... | 1596 | 422 | 899840 | 1799680 | 967 | 463 | 1968 | 32 | 0 |
| xcvc1902-viva1596-2L... | 1596 | 422 | 899840 | 1799680 | 967 | 463 | 1968 | 32 | 0 |
| xcvc1902-viva1596-2L... | 1596 | 422 | 899840 | 1799680 | 967 | 463 | 1968 | 32 | 0 |
| xcvc1902-viva1596-2... | 1596 | 422 | 899840 | 1799680 | 967 | 463 | 1968 | 32 | 0 |
| xcvc1902-viva1596-2... | 1596 | 422 | 899840 | 1799680 | 967 | 463 | 1968 | 32 | 0 |
| xcvc1902-viva1596-2... | 1596 | 422 | 899840 | 1799680 | 967 | 463 | 1968 | 32 | 0 |
| xcvc1902-viva1596-2... | 1596 | 422 | 899840 | 1799680 | 967 | 463 | 1968 | 32 | 0 |
| xcvc1902-viva1596-1L... | 1596 | 422 | 899840 | 1799680 | 967 | 463 | 1968 | 32 | 0 |
| xcvc1902-viva1596-1L... | 1596 | 422 | 899840 | 1799680 | 967 | 463 | 1968 | 32 | 0 |

? < Back Next > Finish Cancel

→ Cliccare su «boards»

→ Cliccare su «Install/Update Boards»

Installazione Avnet Ultra96




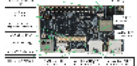



Parts | **Boards**

Reset All Filters

Vendor: All Name: All Board Rev: Latest

Install/Update Boards

Search: ultra (45 matches)

| Display Name | Preview | Vendor | File Version | Part |
|--|---|--------------|--------------|---------------------|
| Ultra96-V2 Single Board Computer |  | avnet.com | 1.2 | xczu3eg-sbva484-1-i |
| Ultra96 Evaluation Platform |  | em.avnet.com | 1.2 | xczu3eg-sbva484-1-e |
| Ultra96v2 Evaluation Platform |  | em.avnet.com | 1.0 | xczu3eg-sbva484-1-e |
| UltraSOM (ZYNQ-UltraScale+) TE0803-2CG-1E(, A: 2GB DDR). SPRT PCB: REV01 |  | trenz.biz | 1.0 | xczu2cg-sfvc784-1-e |
| UltraSOM (ZYNQ-UltraScale+) TE0803-2CG-1E(, A: 2GB DDR) with TEBF0808. SPRT PCB: REV01 |  | trenz.biz | 2.0 | xczu2cg-sfvc784-1-e |

→ Se l'installazione è andata a buon fine, dovremmo riuscire a vedere la piattaforma target.

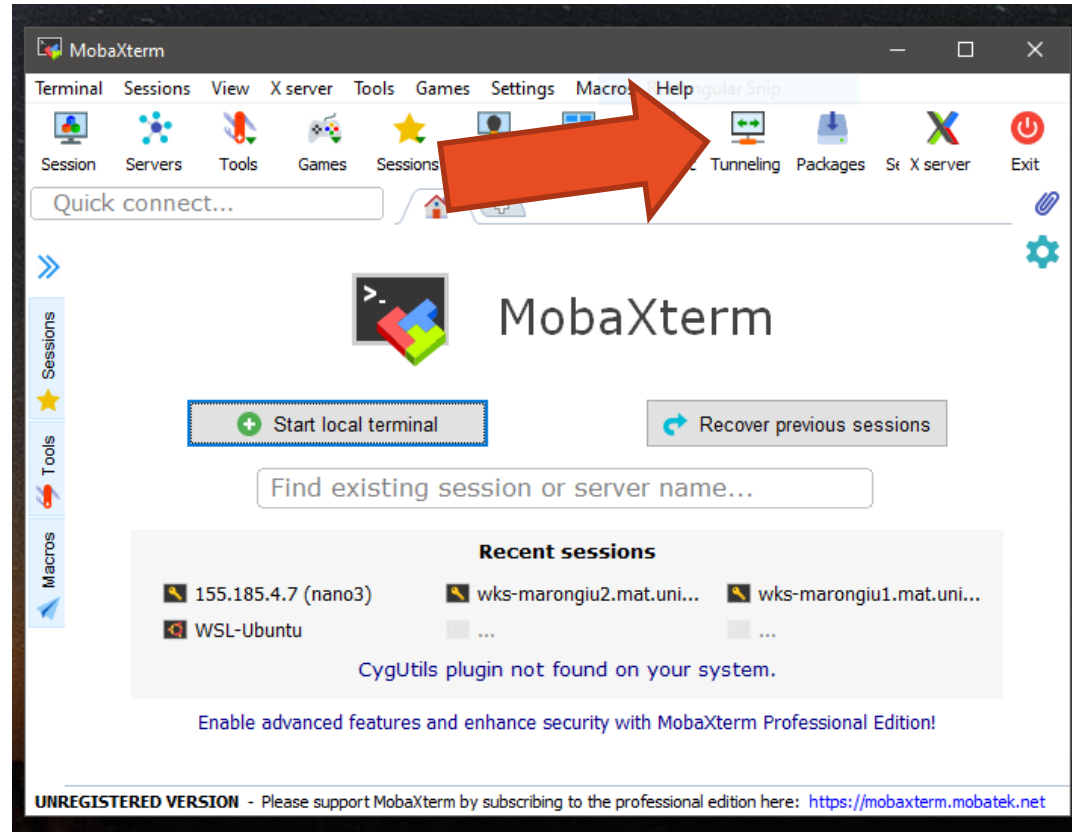
→ Se tutto è a posto chiudere Vivado (senza creare il progetto).

How-to Connect to Hosted Services (Users)

| Nome | Cognome | Workspace | VNC-PORT |
|----------|-----------|--|----------|
| gabriele | savoia | /storage/home0/student/FPGA-LAB/gsavoia | 5012 |
| mattia | savoia | /storage/home0/student/FPGA-LAB/msavoia | 5913 |
| luca | bonacorsi | /storage/home0/student/FPGA-LAB/lbonacorsi | 5914 |
| caterina | croci | /storage/home0/student/FPGA-LAB/ccroci | 5915 |

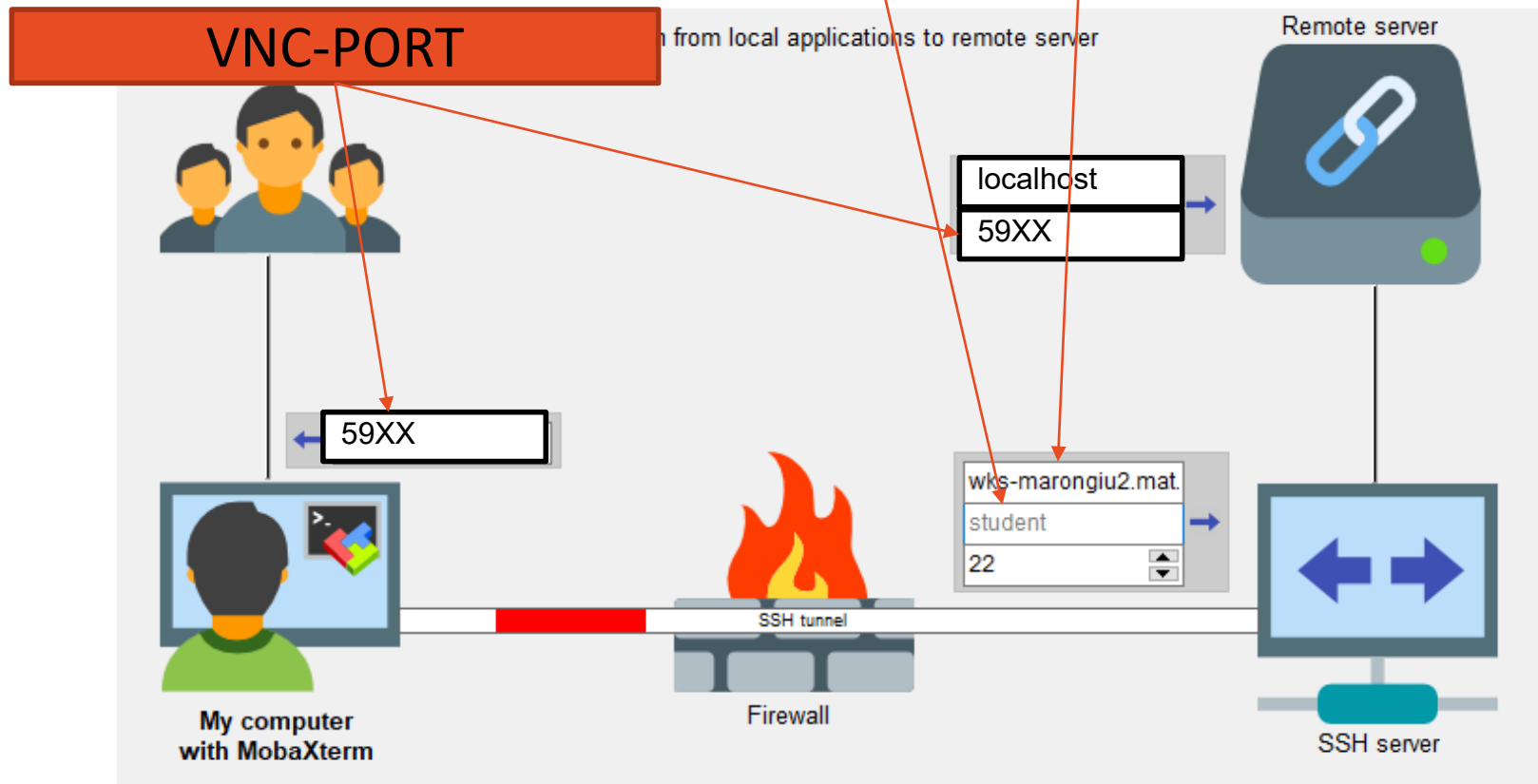
How-to Connect to Hosted Services (Windows)

1. Open MobaXterm
2. Configure the SSH Tunnel



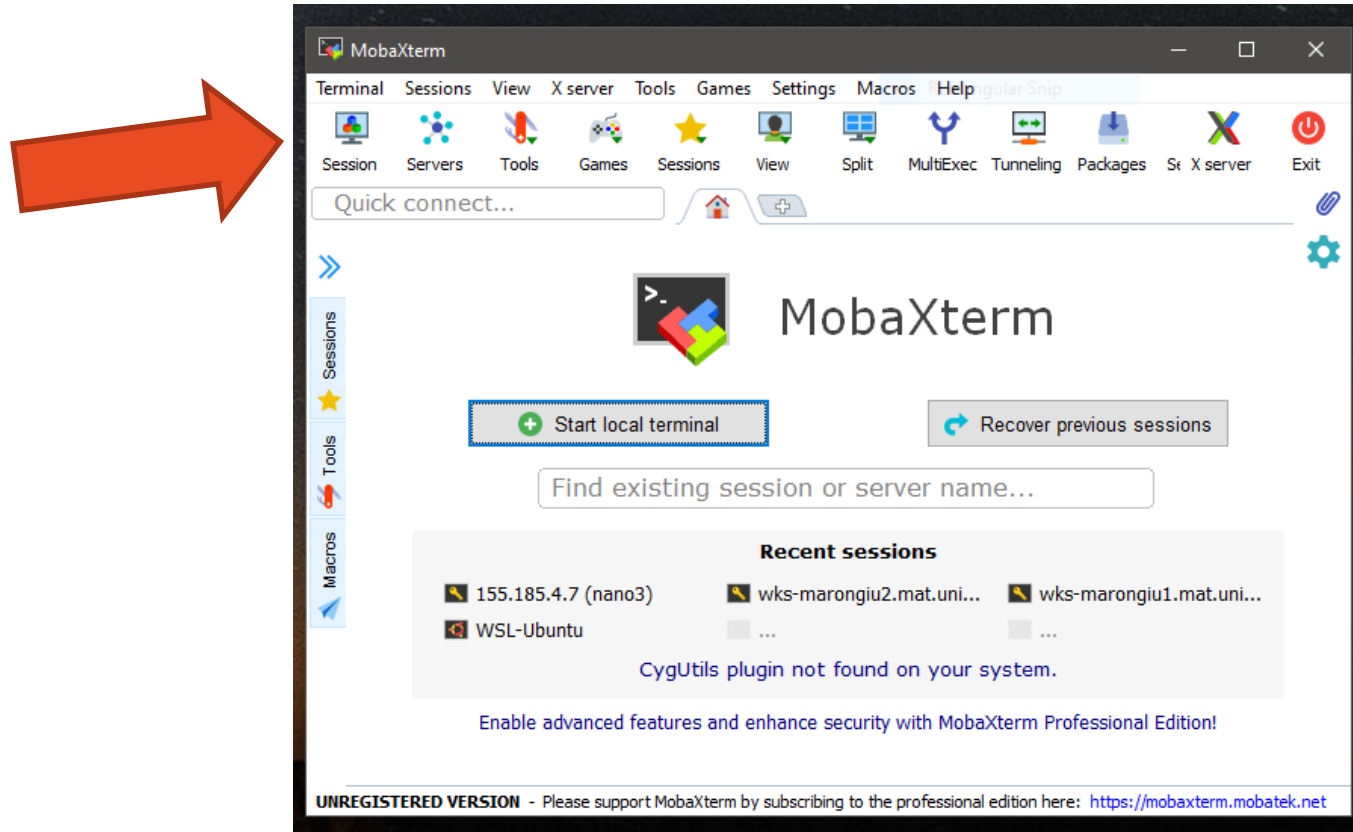
How-to Connect to Hosted Services – The SSH Tunnel

→ *SSH Tunnel URL:* `wks-marongiu2.mat.unimo.it`
→ *User:* `student`
→ *Password:* `hpc2021`



How-to Connect to Hosted Services - Windows

1. Create New Session



How-to Connect to Hosted Services - Windows

1. Open MobaXterm
2. Create New VNC Session
3. Add Your Configuration
4. Prompt Your Password

The image shows a screenshot of the MobaXterm 'Session settings' window. The 'VNC' tab is selected in the top toolbar. In the 'Basic Vnc settings' section, the 'Remote hostname or IP address' field contains 'localhost' and the 'Port' dropdown is set to '5911'. A large red arrow points from the 'localhost' field to a red box labeled 'localhost' on the right. Another red arrow points from the '5911' port dropdown to a red box labeled 'VNC-PORT' on the right. A third red arrow points from the 'MobaXterm' password prompt dialog to a red box labeled 'hpc2021' on the right. The password prompt dialog shows the text 'VNC password for server localhost:' and an empty password field. Below the field is a checkbox labeled 'Show password' which is unchecked. At the bottom of the dialog are 'OK' and 'Cancel' buttons. A large red arrow points from the 'VNC session' area of the settings window towards the bottom left.

How-to Connect to Hosted Services – Linux/Mac

1. Open Terminal
2. Create the SSH Tunnel

```
ssh -N -L <59XX>:localhost:<59XX> student@wks-marongiu2.mat.unimo.it -v
```

3. Connect using your preferred VNC Client (remmina, realvnc):

| | |
|----------------|------------------|
| → VNC URL: | <i>localhost</i> |
| → Port: | <i>59XX</i> |
| → VNCPassword: | <i>hpc2021</i> |

Once connected

1. Use your own folder (all users share the same user)
2. Load Xilinx Vivado tools Environment:

\$module load xilinx/2019.2

3. Launch Vivado:

\$vivado_hls

