Vivado Design Suite

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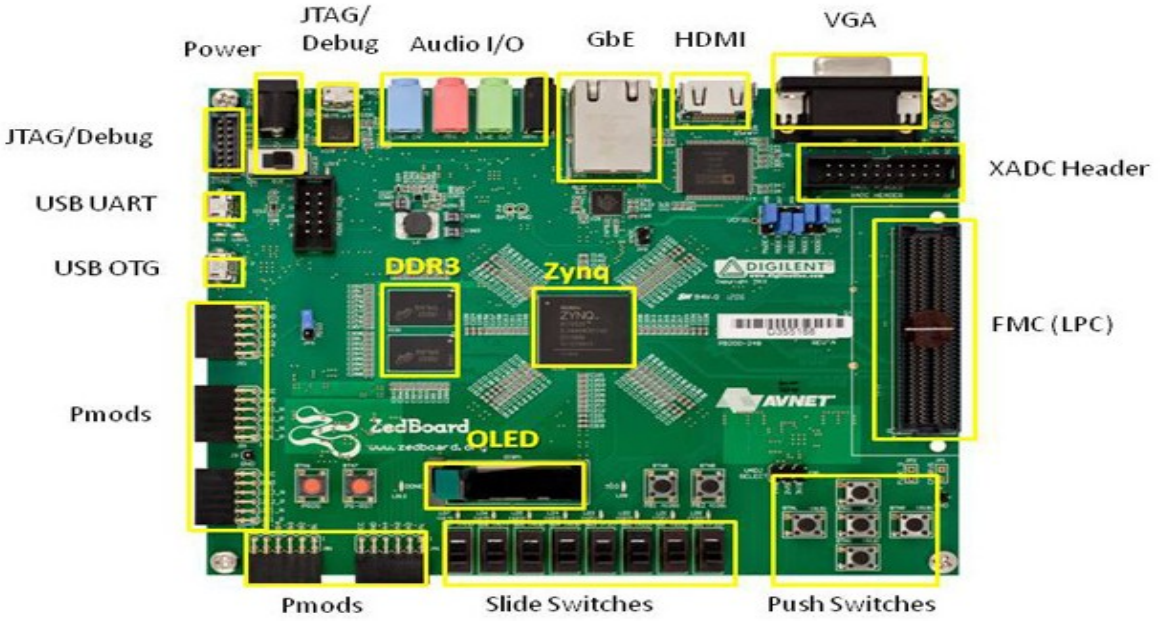
CS-220

FPGAs

- A field-programmable gate array (FPGA) is a circuit designed to be configured using hardware description language HDL



* SD card cage and QSPI Flash reside on backside of board

Vivado

Produced by Xilinx

- A software suite used for

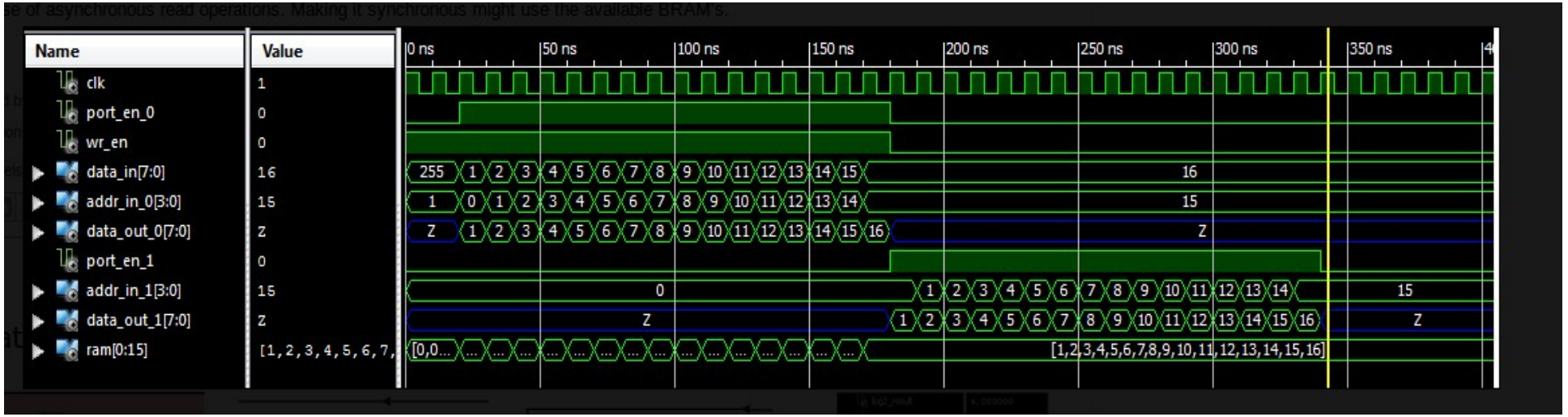
  1) Simulation

  2) Synthesis

  of HDL (Hardware Design Language such as SystemVerilog) designs

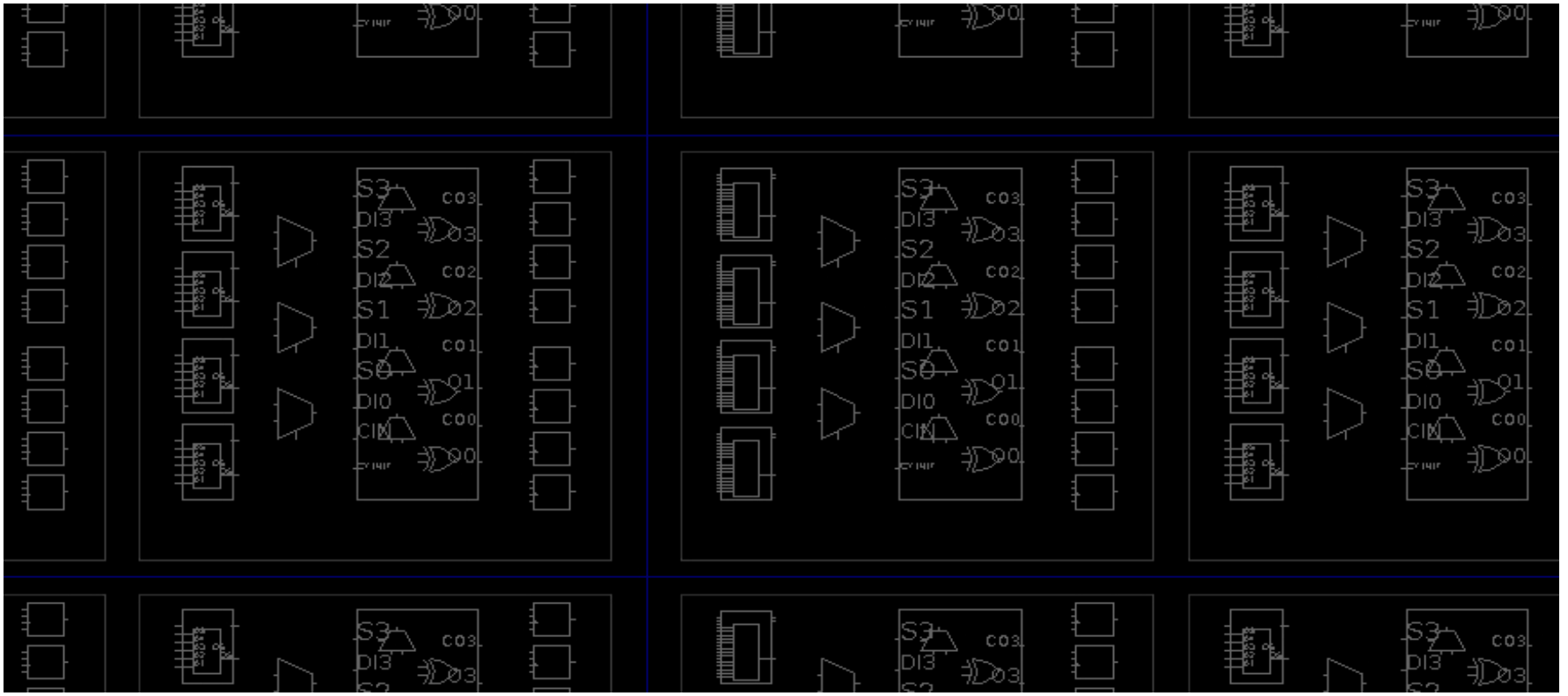
Simulation

- The simulation of an electronic circuit helps the designer by visualizing the circuit's behavior

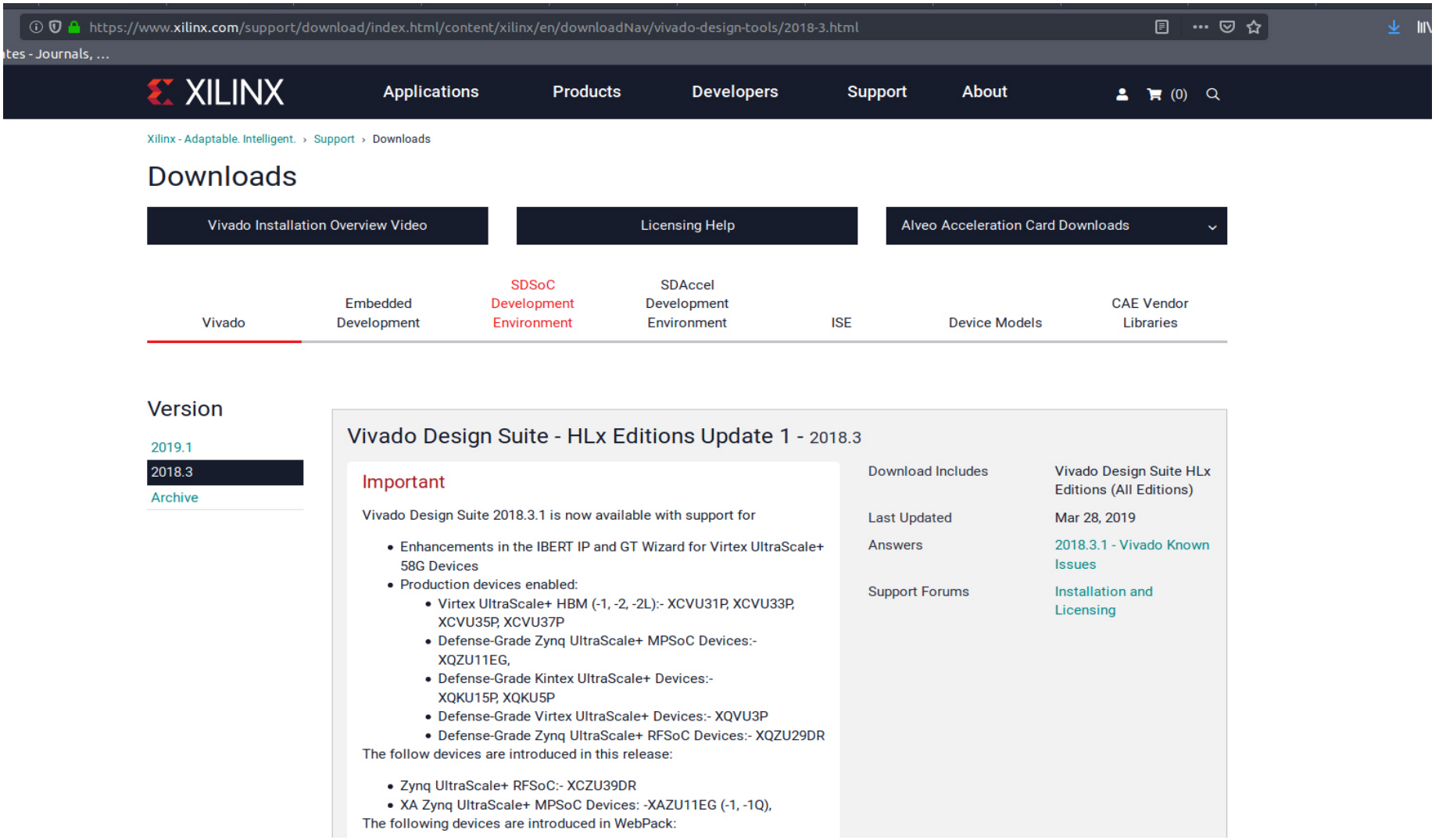


Synthesis

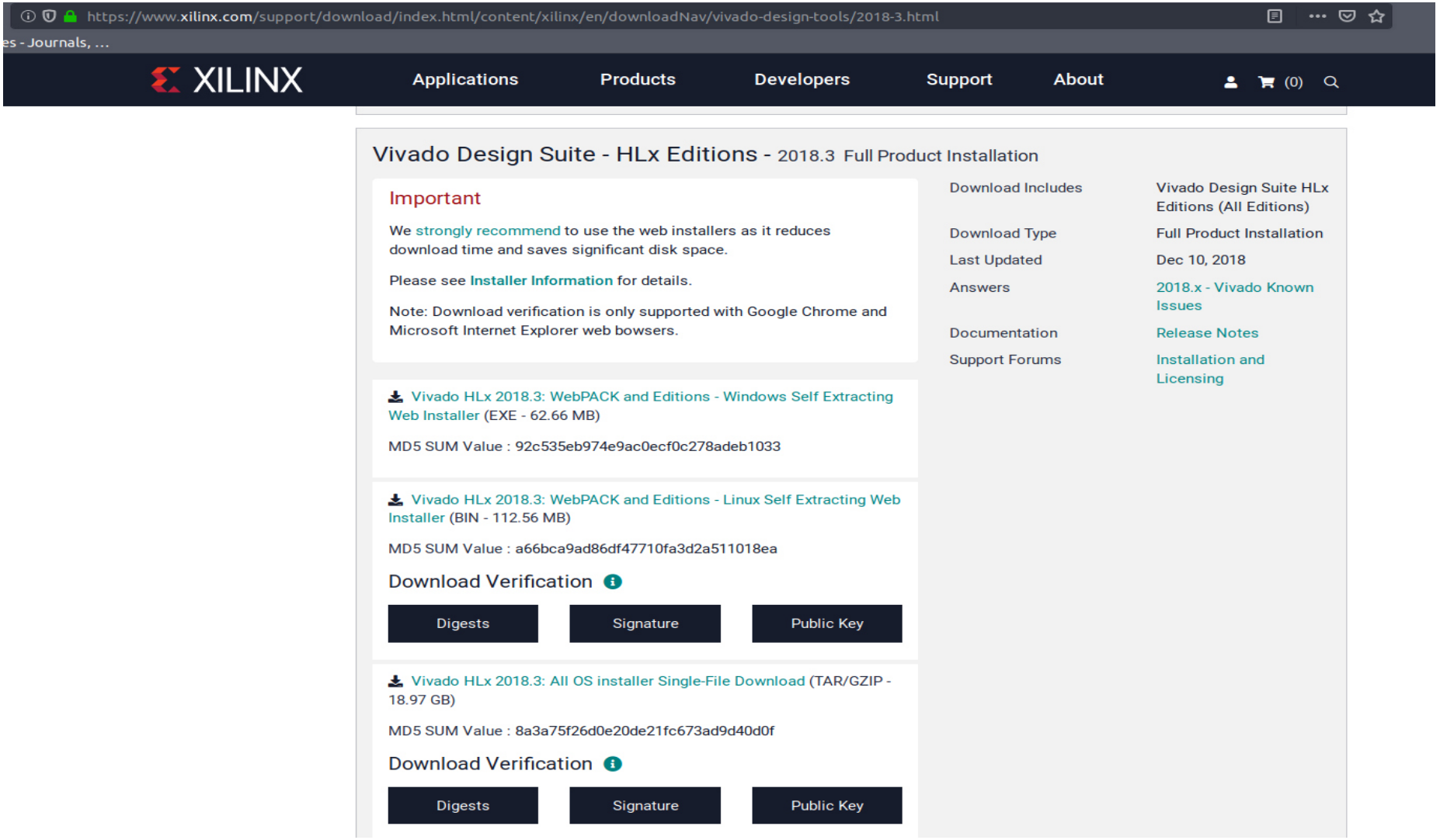
- Synthesis generates LUT-level schematic of the design



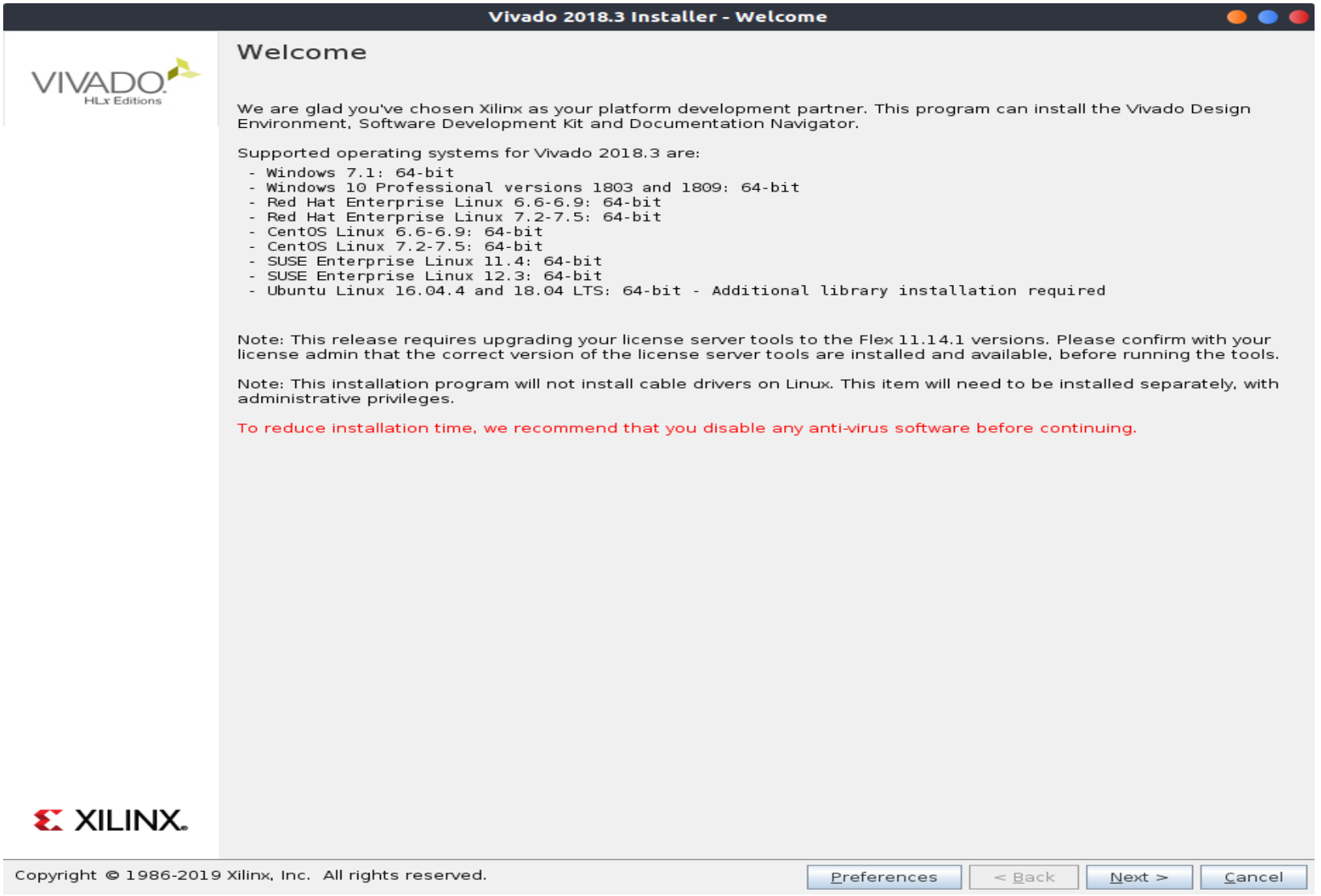
Vivado Installation



Vivado Installation (cont'd)



Vivado Installation (cont'd)



Vivado Installation (cont'd)

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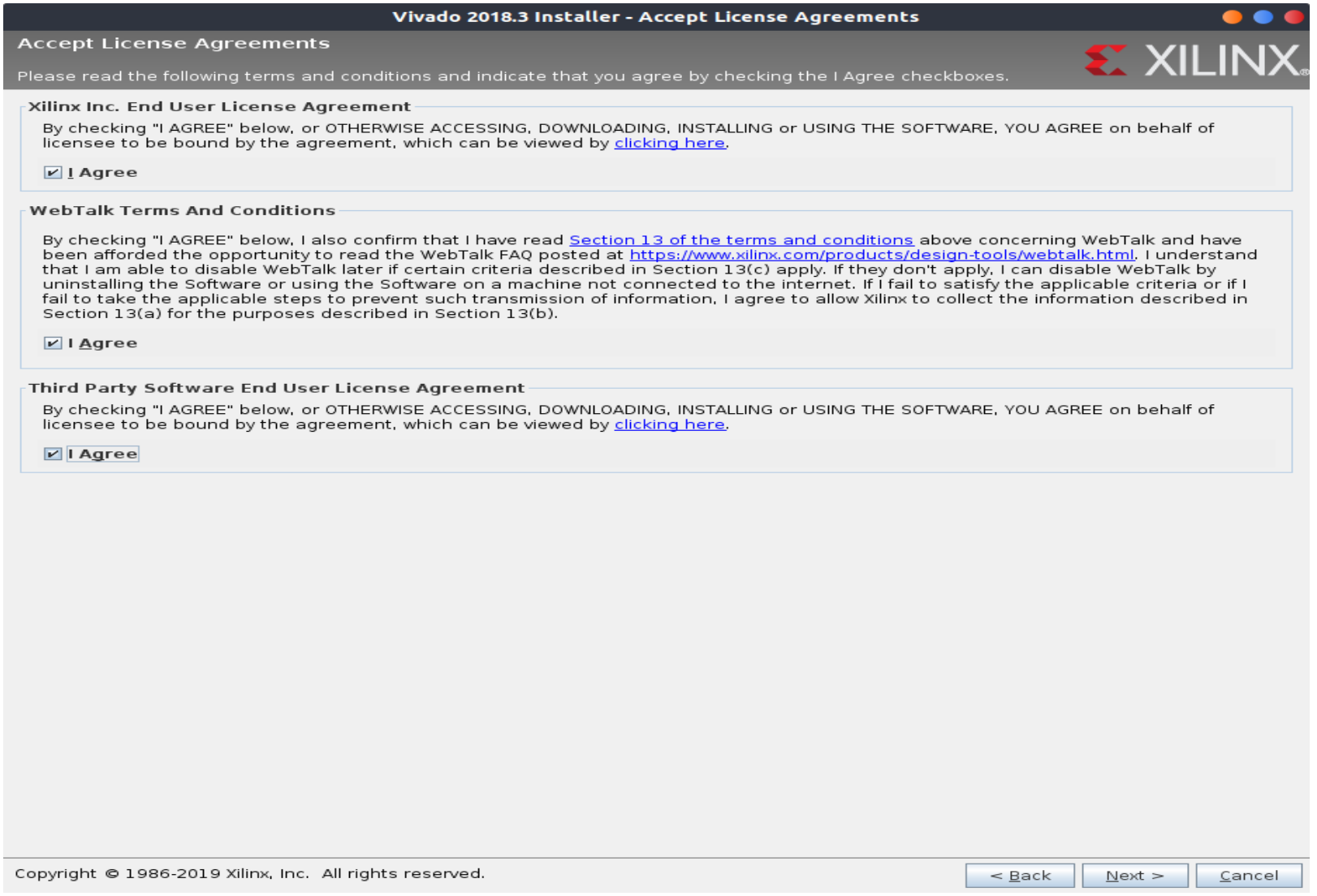
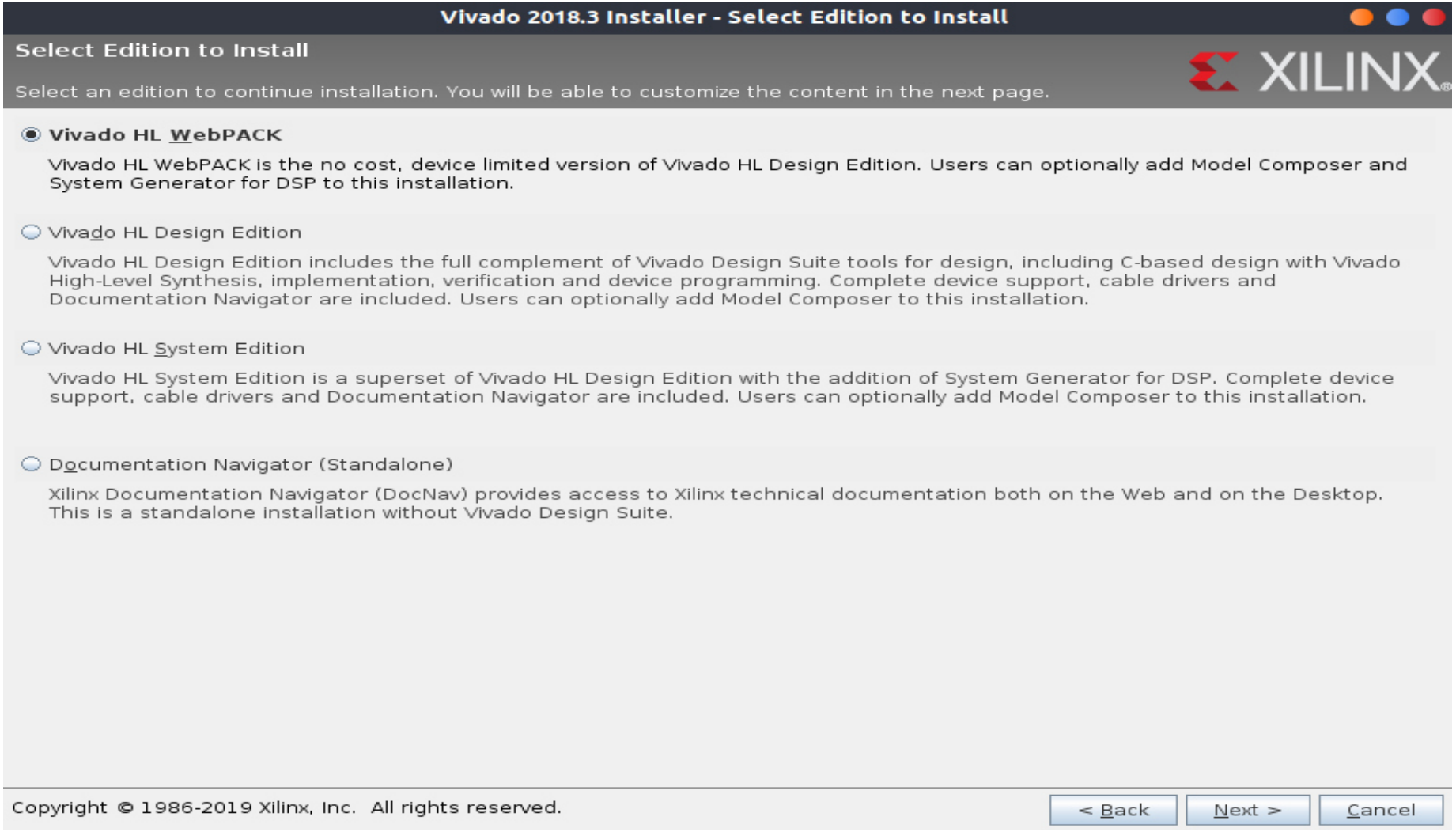
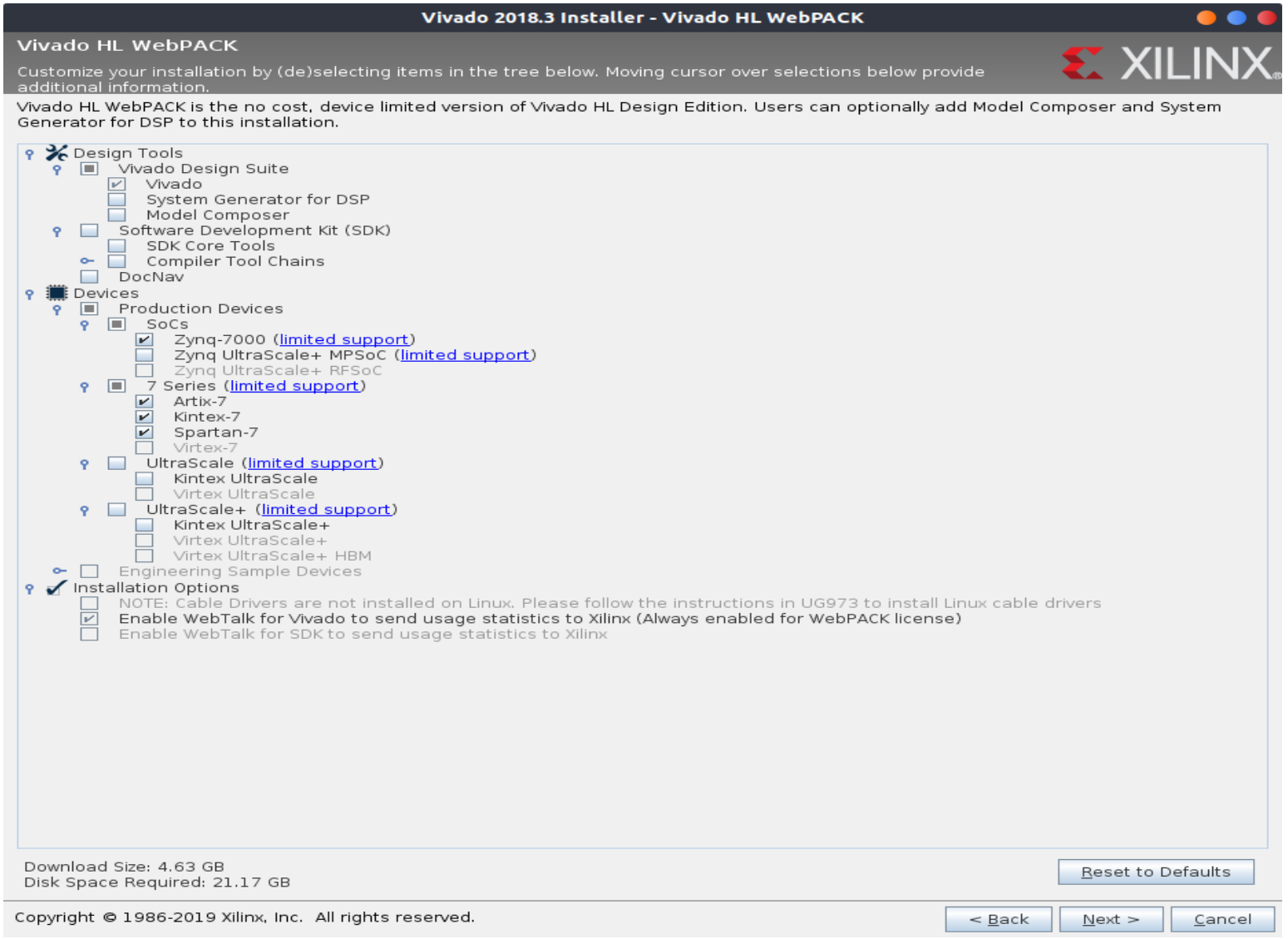


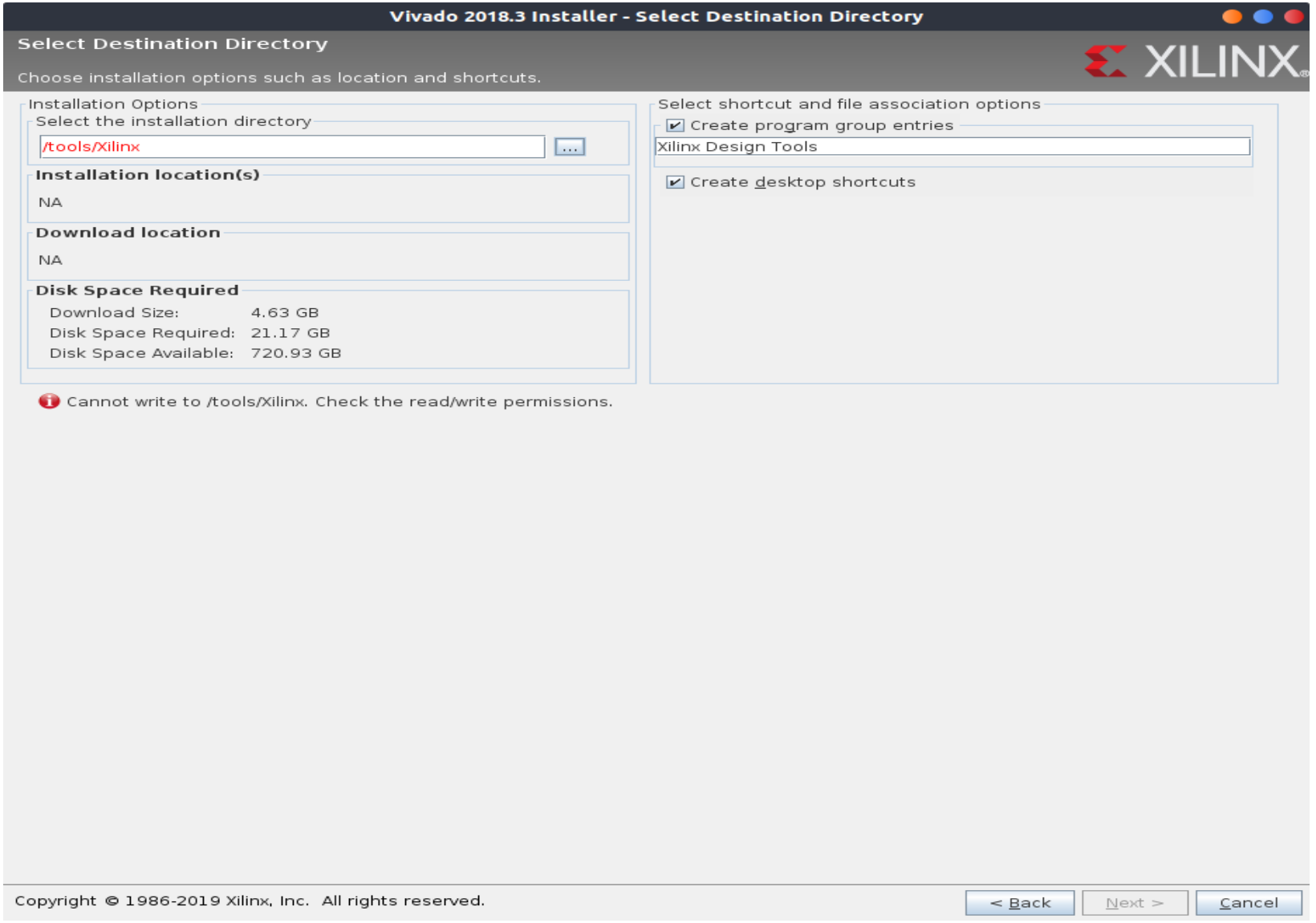
Vivado Installation (cont'd)



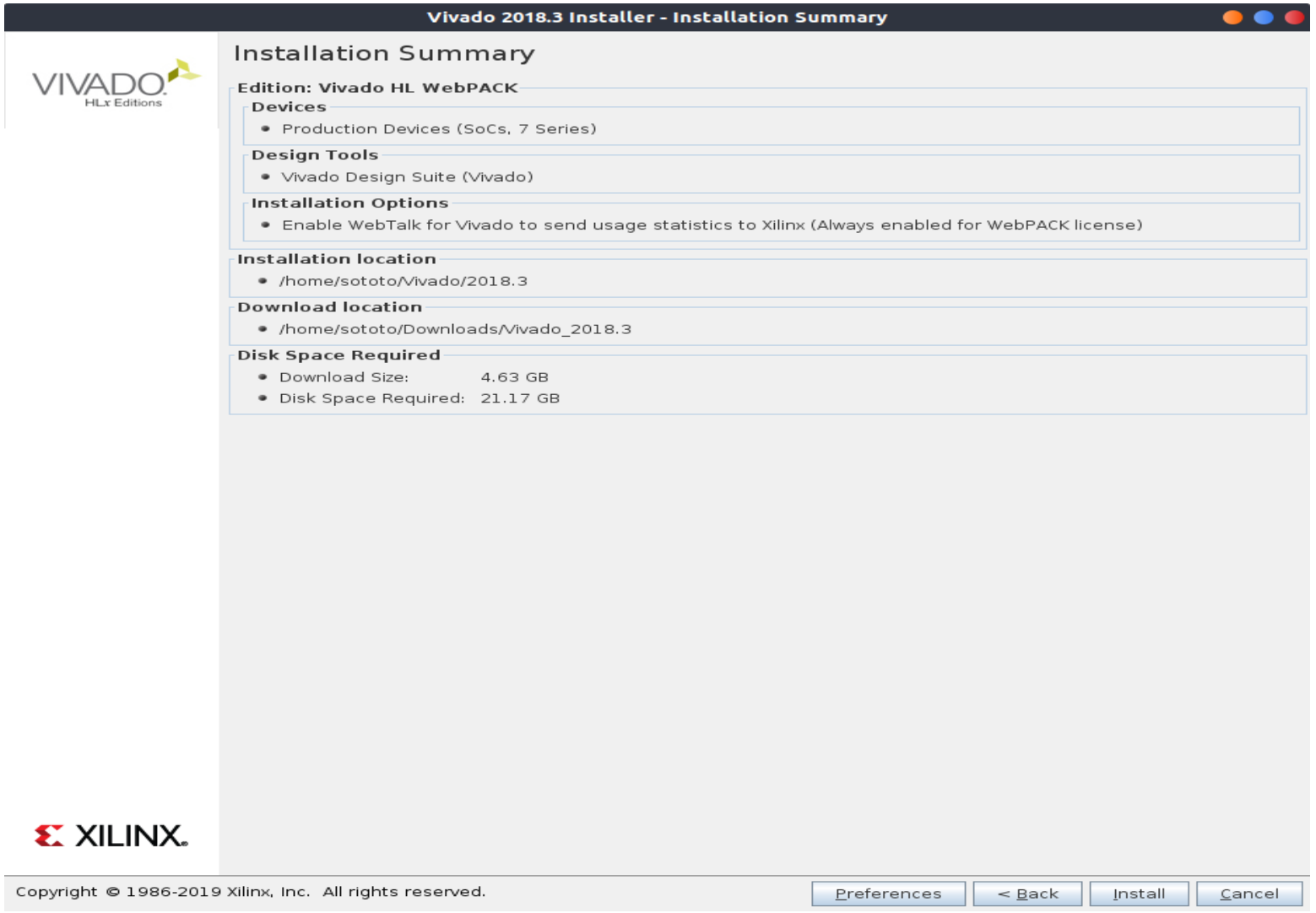
Vivado Installation (cont'd)



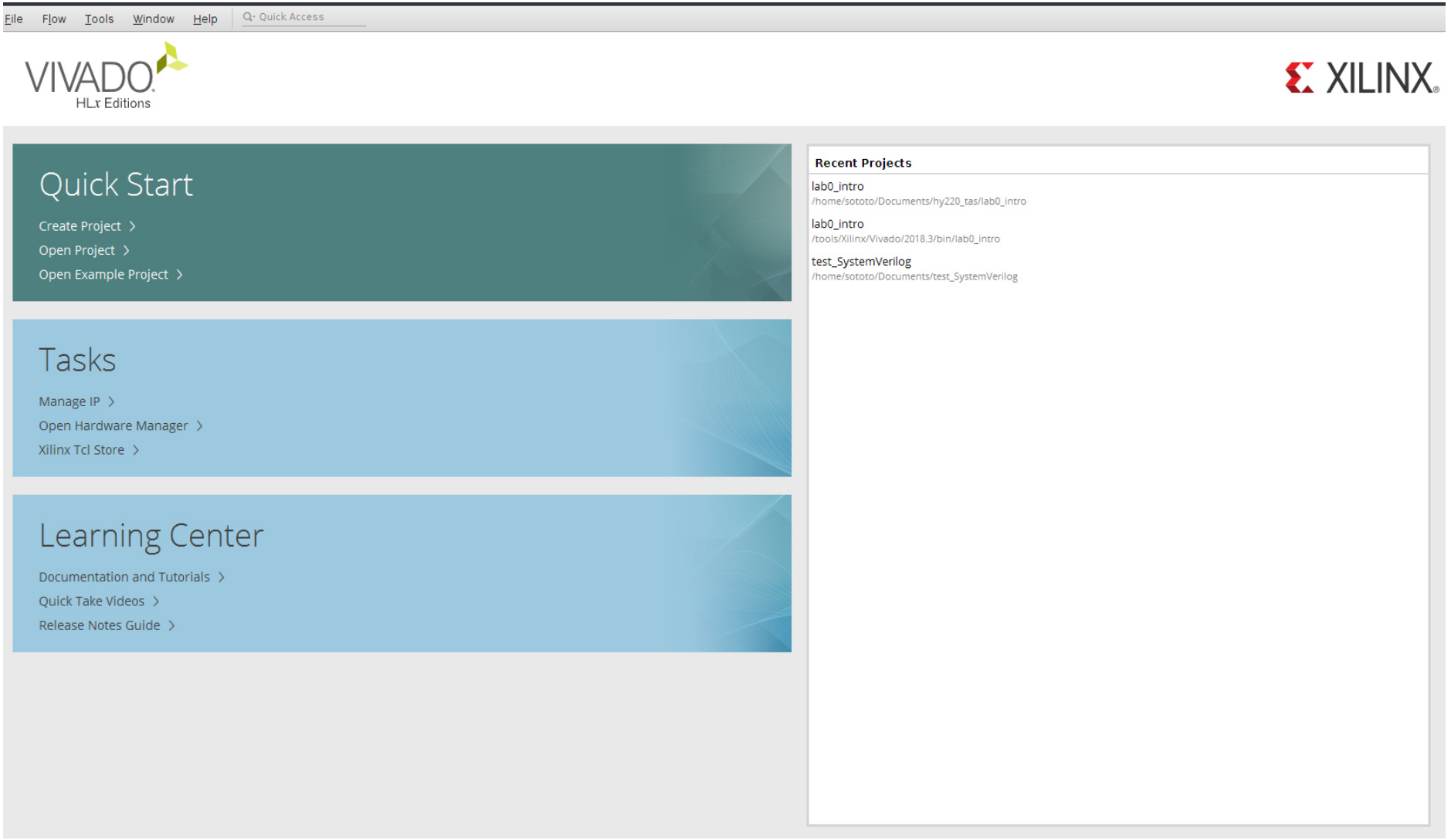
Vivado Installation (cont'd)



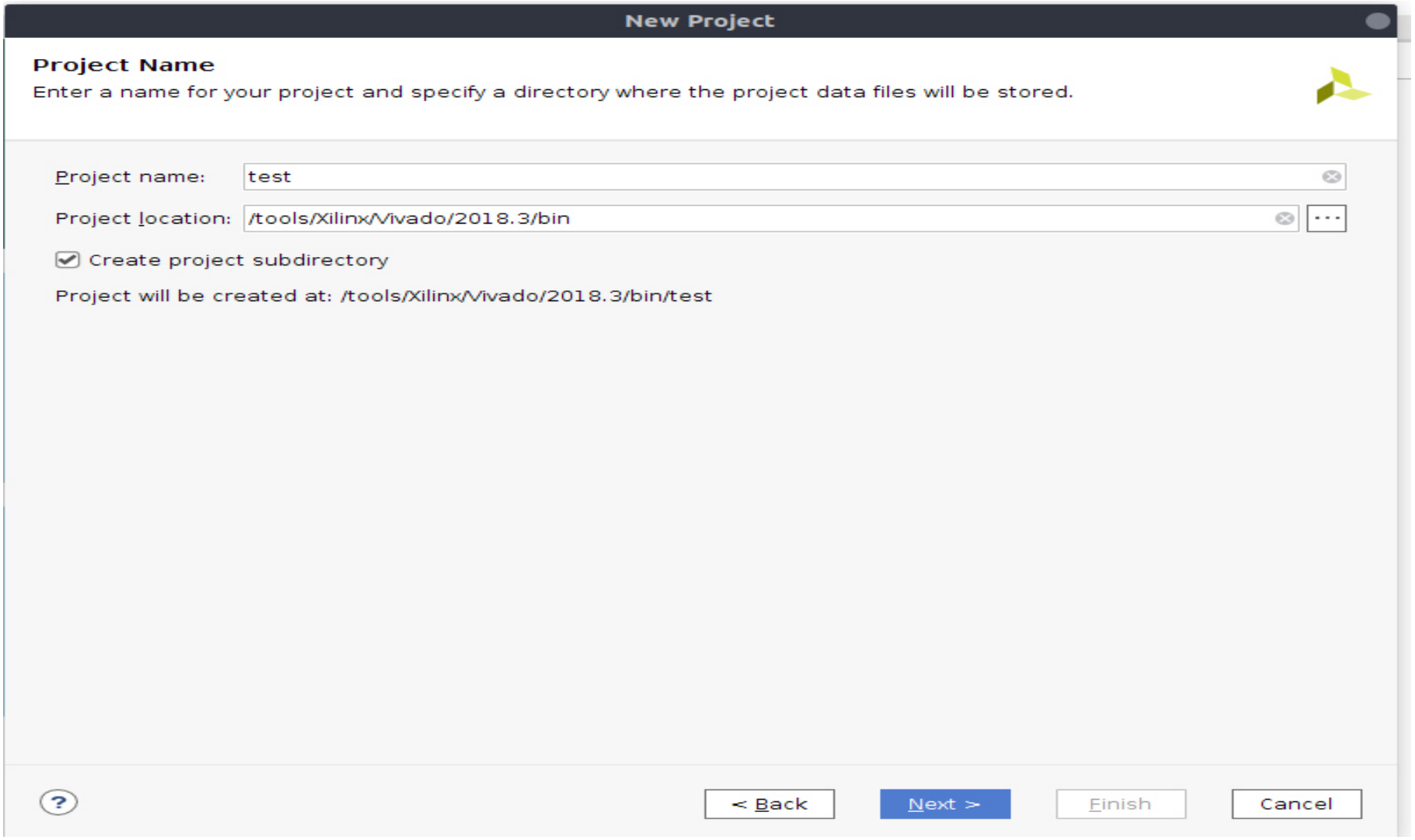
Vivado Installation (cont'd)



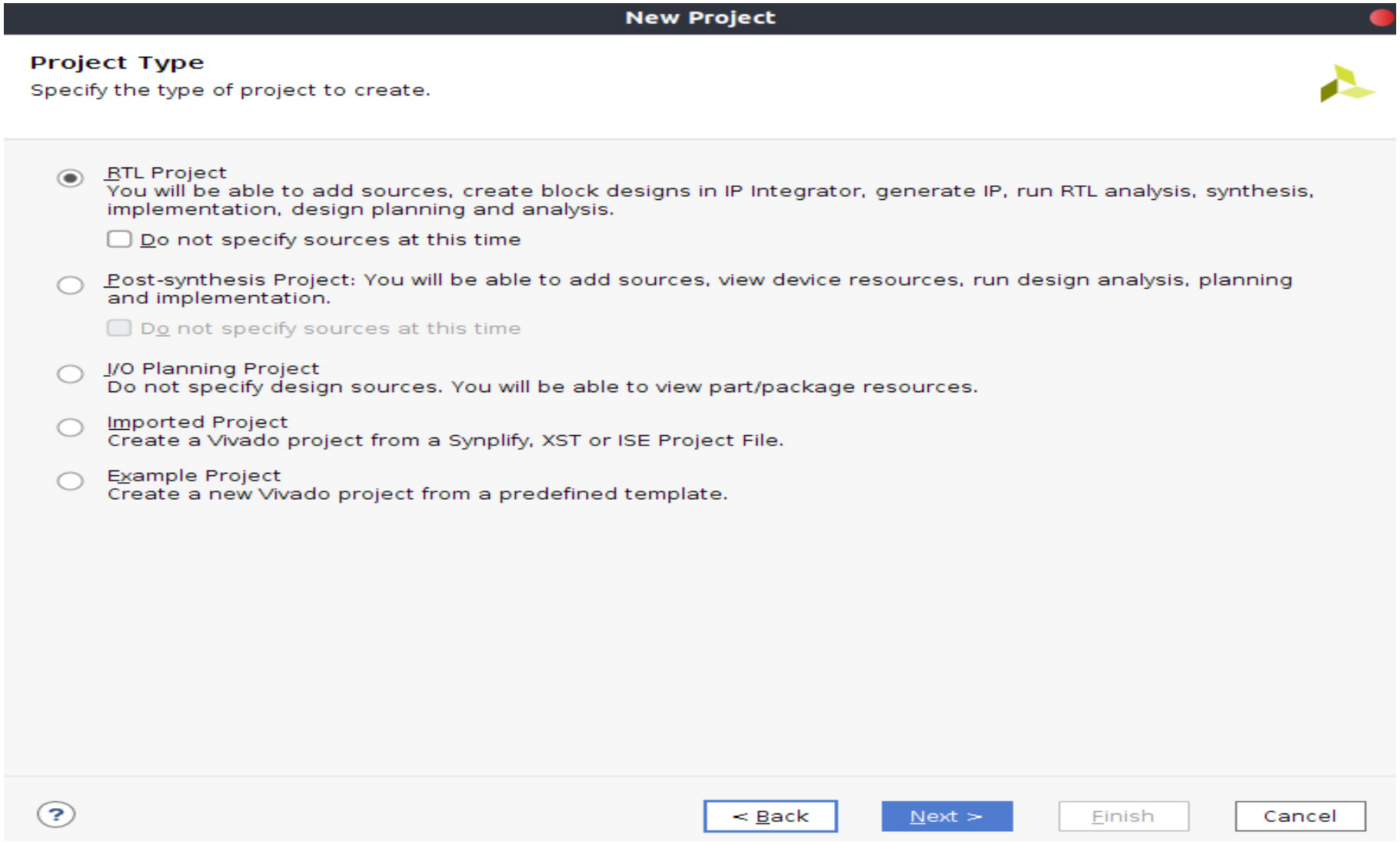
Creating a project



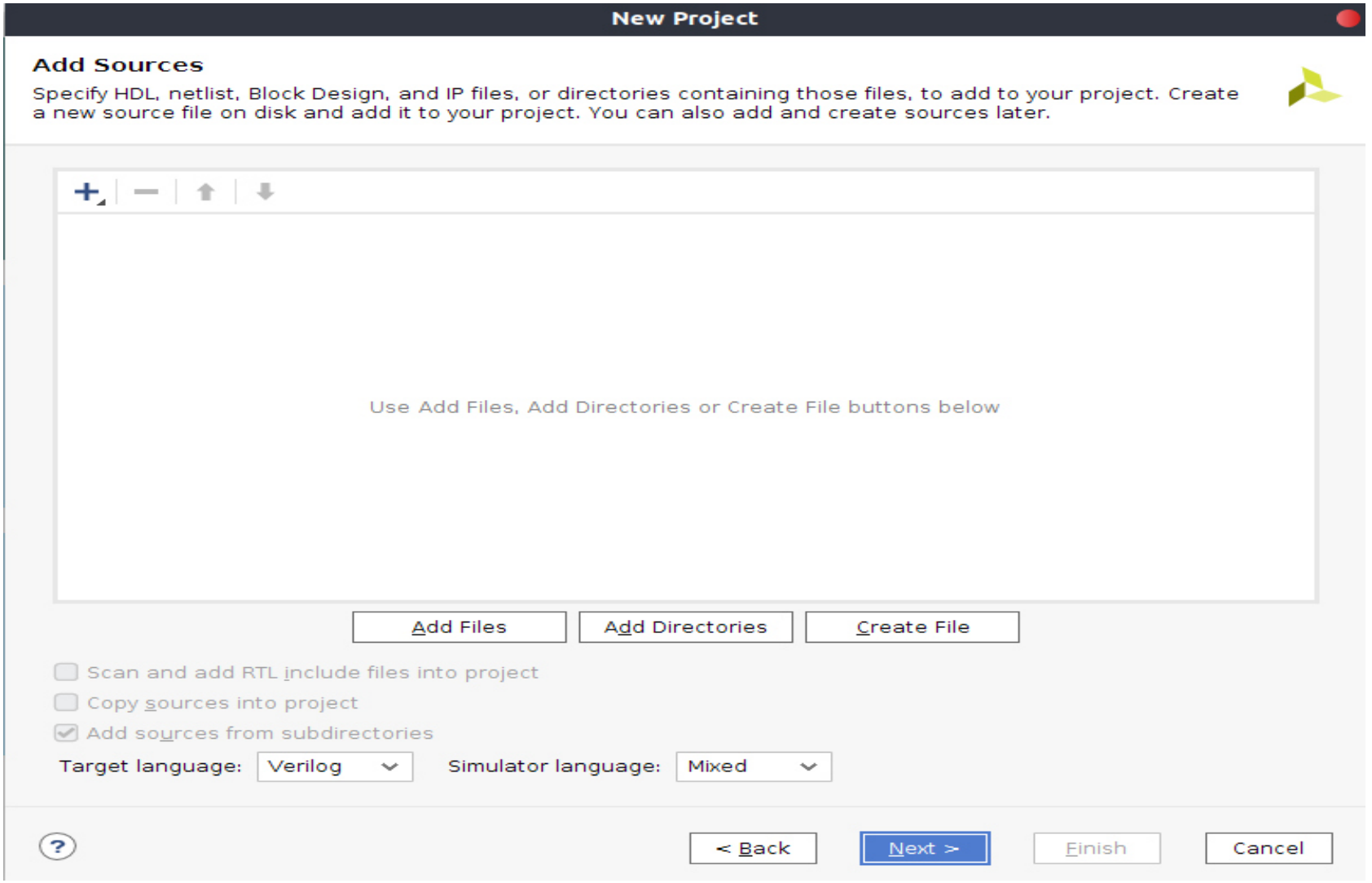
Creating a project (cont'd)



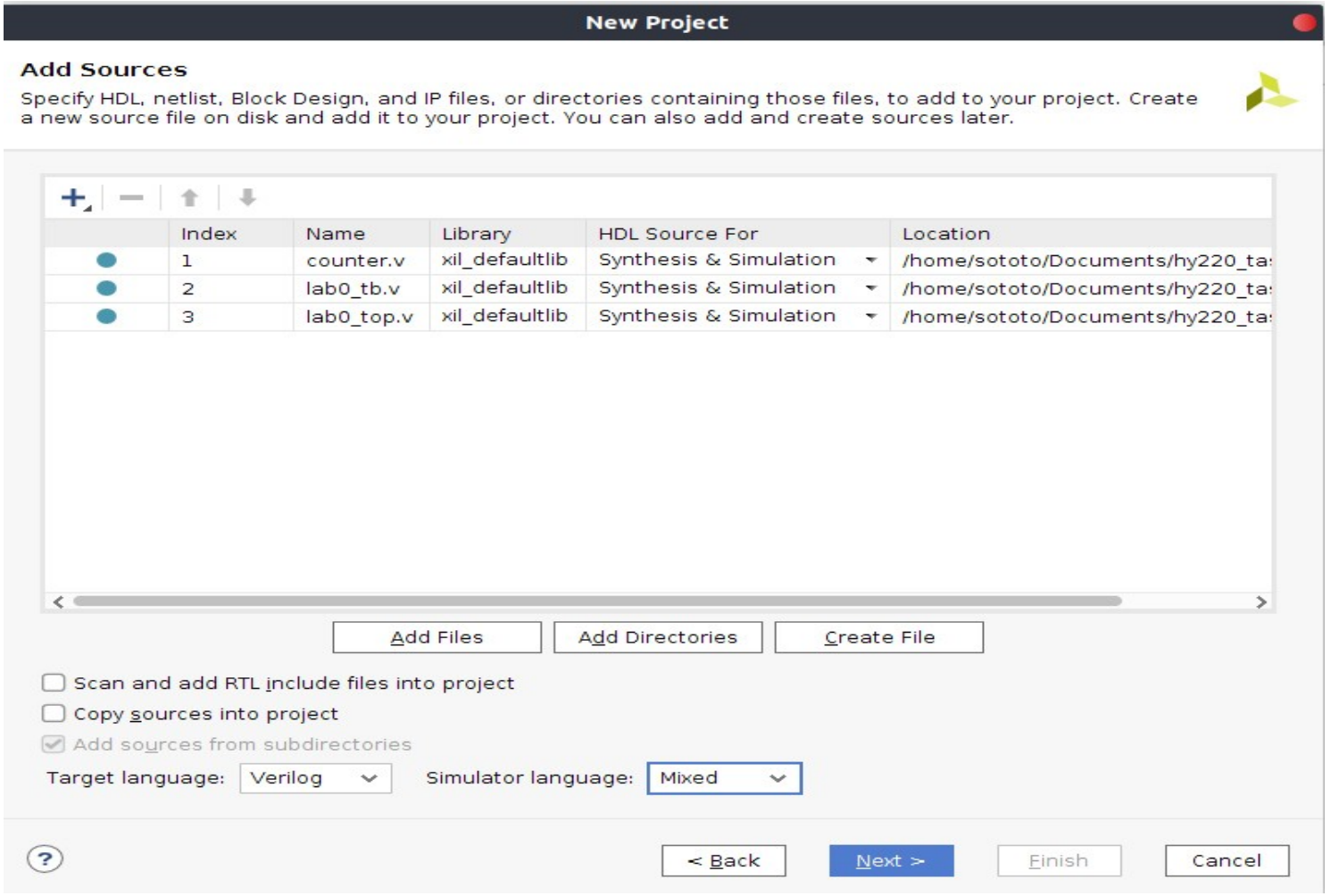
Creating a project (cont'd)



Creating a project (cont'd)

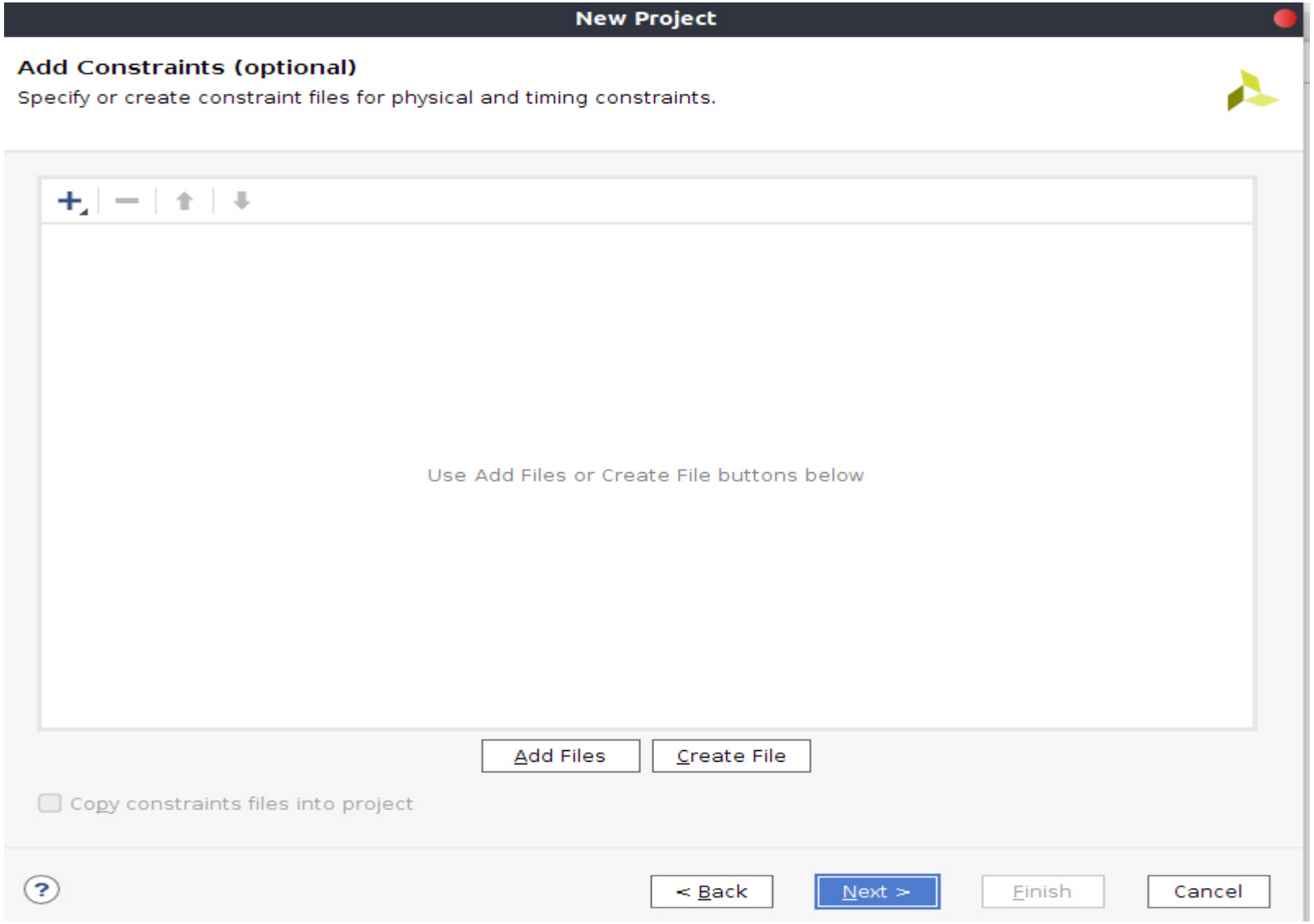


Create a project (cont'd)



- Wrong!!!
- lab0_tb.v must be set for simulation only!!!
- Testbenches include non-synthesizable code!!!

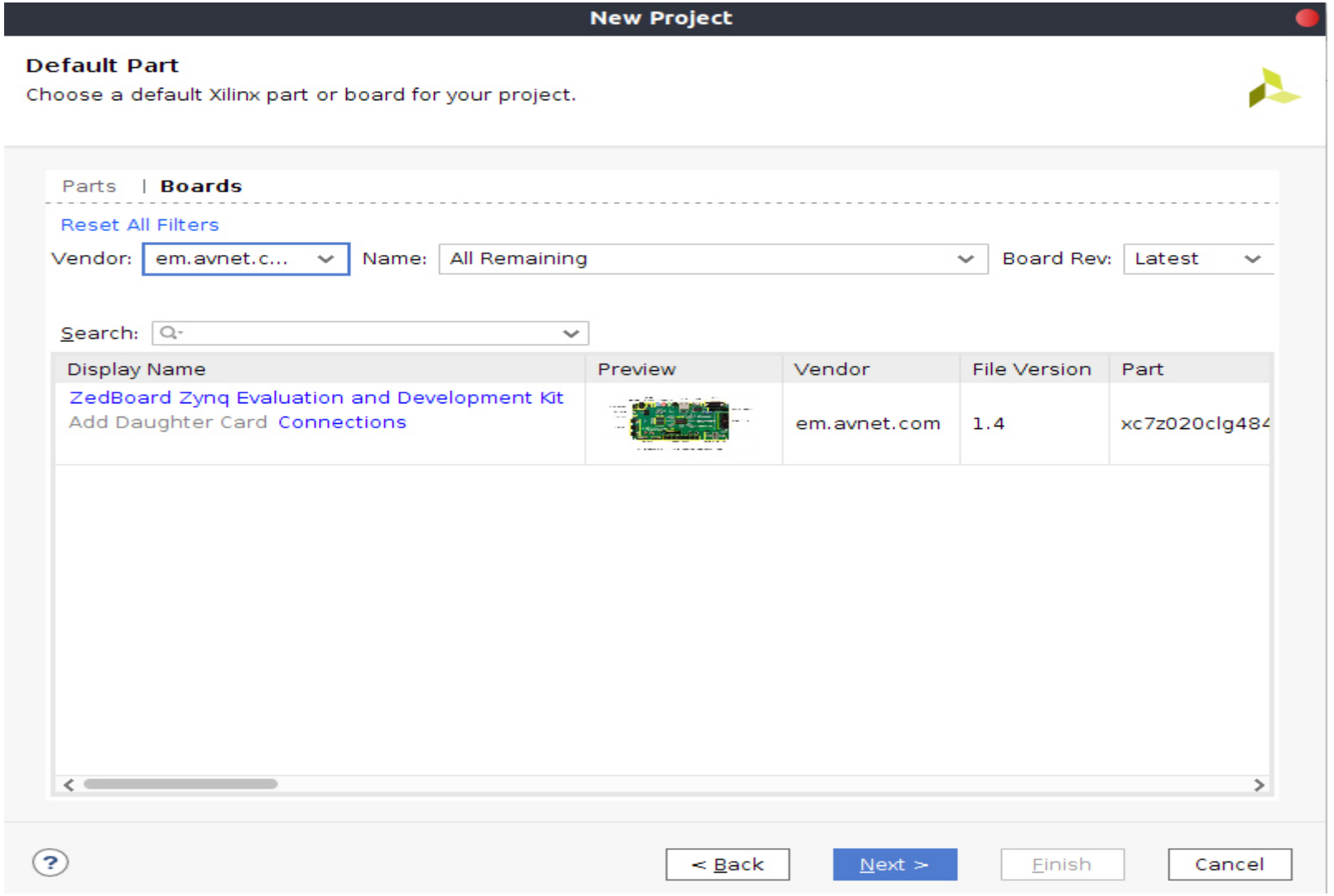
Create a project (cont'd)



Constraints file

- When programming an FPGA through software such as Xilinx's Vivado, you need to inform the software what physical pins on the FPGA that you plan on using.
- Xilinx Design Constraints file (XDC file)

Creating a project (cont'd)



Flow Navigator

- Run Simulation

  -Will show the waveform of the design that represents its behavior

  → most bugs can be caught here!!!

- Open Elaborated Design

  -Generates the schematic of your code

  → can be useful when you want to know exactly all and non-trivial connections of the design

Flow Navigator

- Run Synthesis

  -Will show the corresponding LUT schematic of the selected device

  →Info about timing, utilization and critical paths!!!

- Run Implementation

  -Here the same schematic as before will be showed with the design implemented on it for our selected device

Flow Navigator

- Generate Bitstream

  -In here the bitstream is generated by the initial design in order to program the selected device

- Open Hardware Manager

  -Open Target to find the connected device

  -Program Device to download the generated bitstream to the connected device!

Demo time!!!

Questions...?