

處理器設計與實作

實習講義

編撰者

成大電機所計算機架構與系統研究室CASLAB

國立成功大學電機系與電機研究所

LAB 8-10: ARM & FPGA 環境安裝教學

實驗環境

⊕ Tool used :

1. ARM GNU Toolchain

- 利用GNU的ARM Cross Compiler將C轉成arm assembly和machine code

2. Mentor Modelsim

- 看平台上的wave來驗證CPU和AHB的行為

3. Vivado 2016.4

- 將驗證過後的平台透過Vivado合成成bit檔

4. Nexys 4 DDR board

- 利用此驗證版將平台燒錄至FPGA中並使用板子上的I/O驗證行為

ARM GNU Toolchain安裝

1. ARM GNU Toolchain install

- 安裝檔附於Lab8實驗目錄中，解壓縮後以**管理員**
權限執行GNUCross_Compiler/Install.bat 即可

Modelsim 安裝

1. Modelsim PE overview

- <http://model.com/content/modelsim-pe-simulation-and-debug>

2. Modelsim PE download

- <http://model.com/update/modelsim-downloads>
- 已經有裝**破解版**的可以不用重裝

Vivado 安裝

1. Vivado Design Suite User Guide

- http://www.xilinx.com/support/documentation/sw_manuals/xilinx2016_4/ug973-vivado-release-notes-install-license.pdf

2. Vivado Design Suite download

- <https://www.xilinx.com/support/download/index.html/content/xilinx/en/downloadNav/vivado-design-tools/archive.html>

Vivado 安裝

3. 下載Vivado HLx 2016.4: WebPACK and Editions

- Operating System: Windows 10
- Disk space required: 10.35 GB
- 要先註冊帳號，個人資料需填英文名字且勿用自動填入，否則會遇到「Names with Non-Alphanumeric characters or accents are not supported by US export compliance systems.」

Vivado 安裝

4. 安裝 Vivado

- 安裝過程需登入

Vivado 2016.4 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

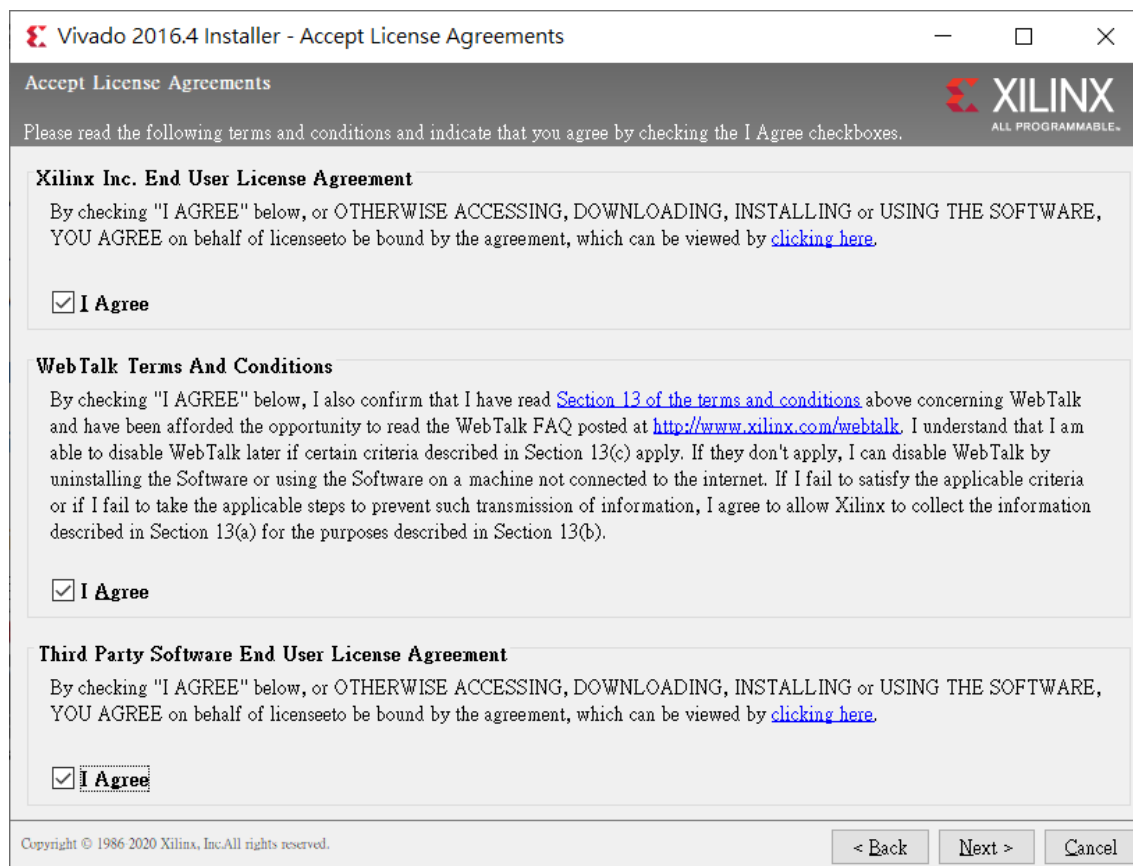
☒ Download and Install Now

Select your desired device and tool installation options and the installer will download and install just what is required. Downloaded installation files will be saved for future use. NOTE: Future installs using these downloaded files will be restricted to the options selected during this install. For access to all options later, choose "Download Full Image".

Vivado 安裝

4. 安裝 Vivado

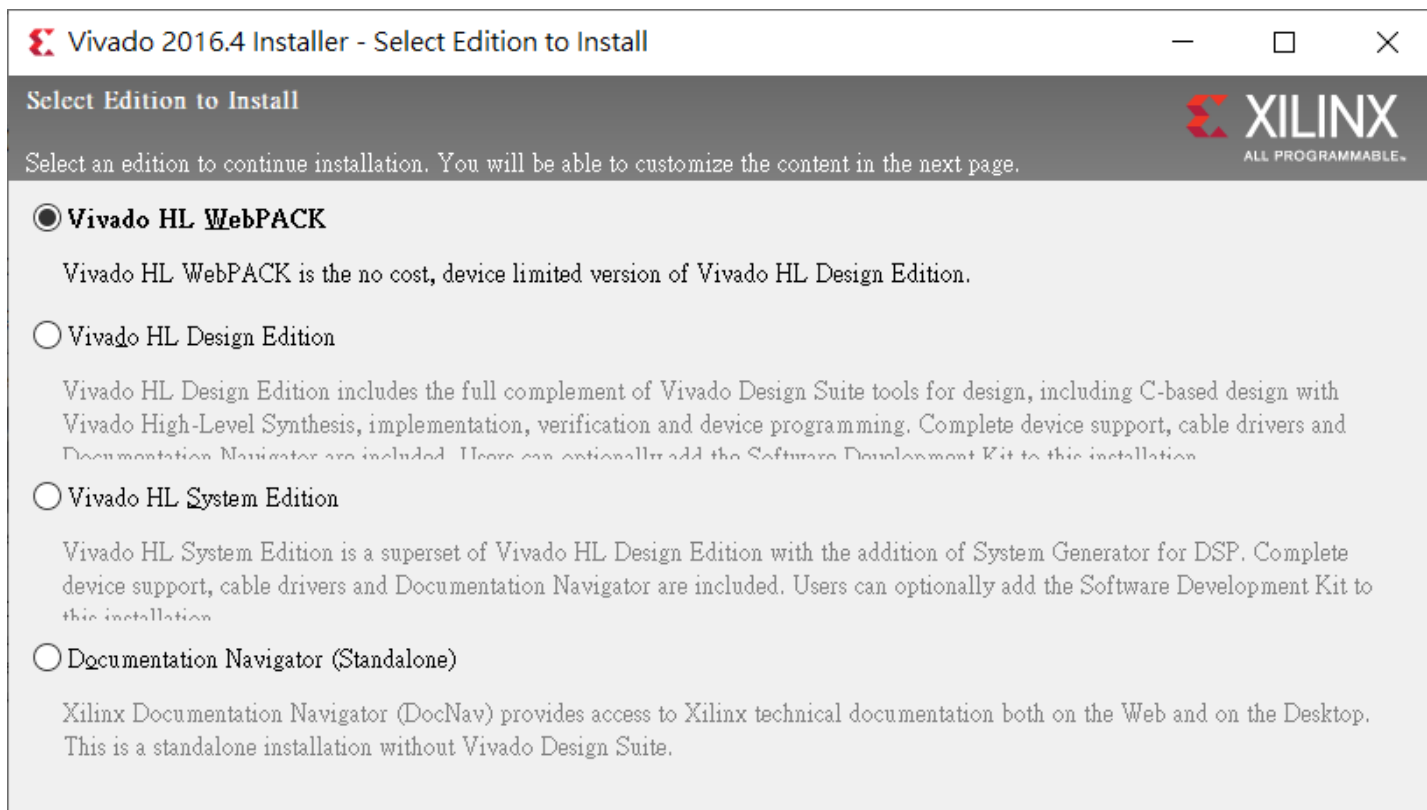
- 同意事項請全勾



Vivado 安裝

4. 安裝 Vivado

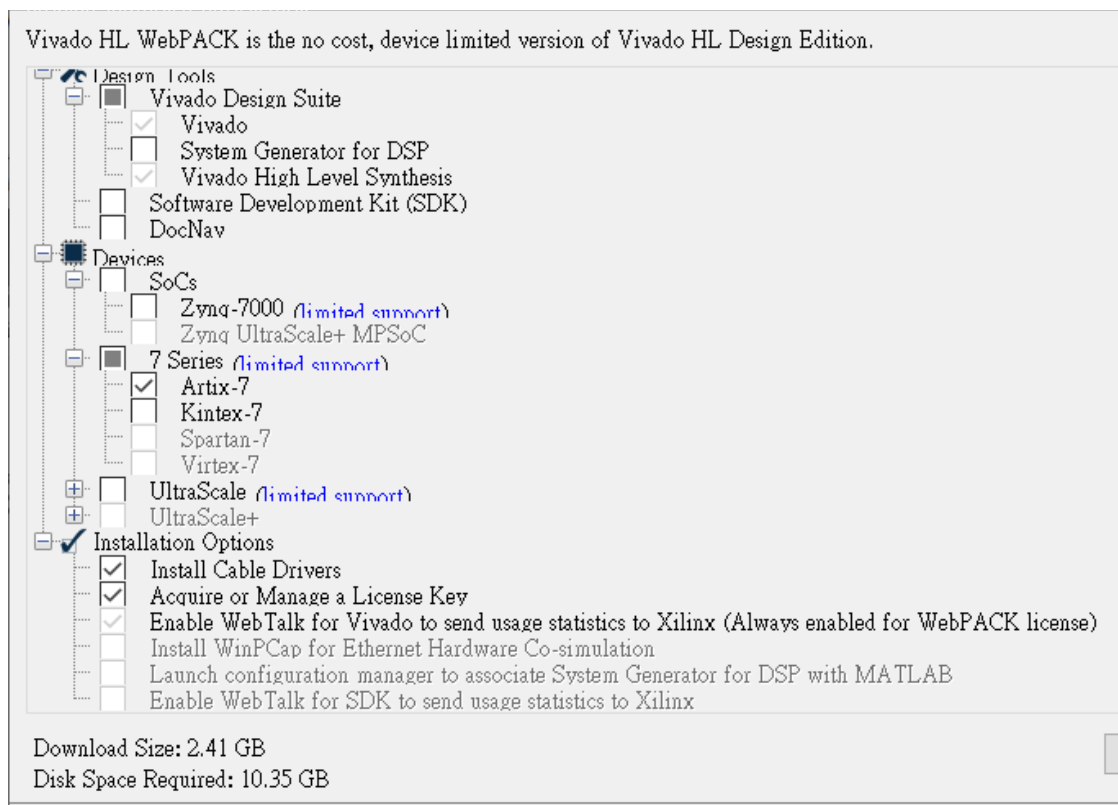
- Edition 選擇 *WebPACK*



Vivado 安裝

4. 安裝 Vivado

- 用不到的都取消勾選，務必注意硬碟剩餘空間



Vivado 安裝

5. Vivado License Manager

- 選擇倒數第二個選項，點左邊的選項申請 license

Select one of the following options

- ☐ Start Now! 30 Day Trial (No Bitstream)
- ☐ Get Vivado or IP Evaluation Licenses
- ☐ Get Free ISE WebPACK, ISE/Vivado IP or PetaLinux Licenses
- ☒ Get My Full or Purchased Certificate-Based License
- ☐ Get My Full or Purchased Activation-Based License

Vivado 安裝

5. Vivado License Manager

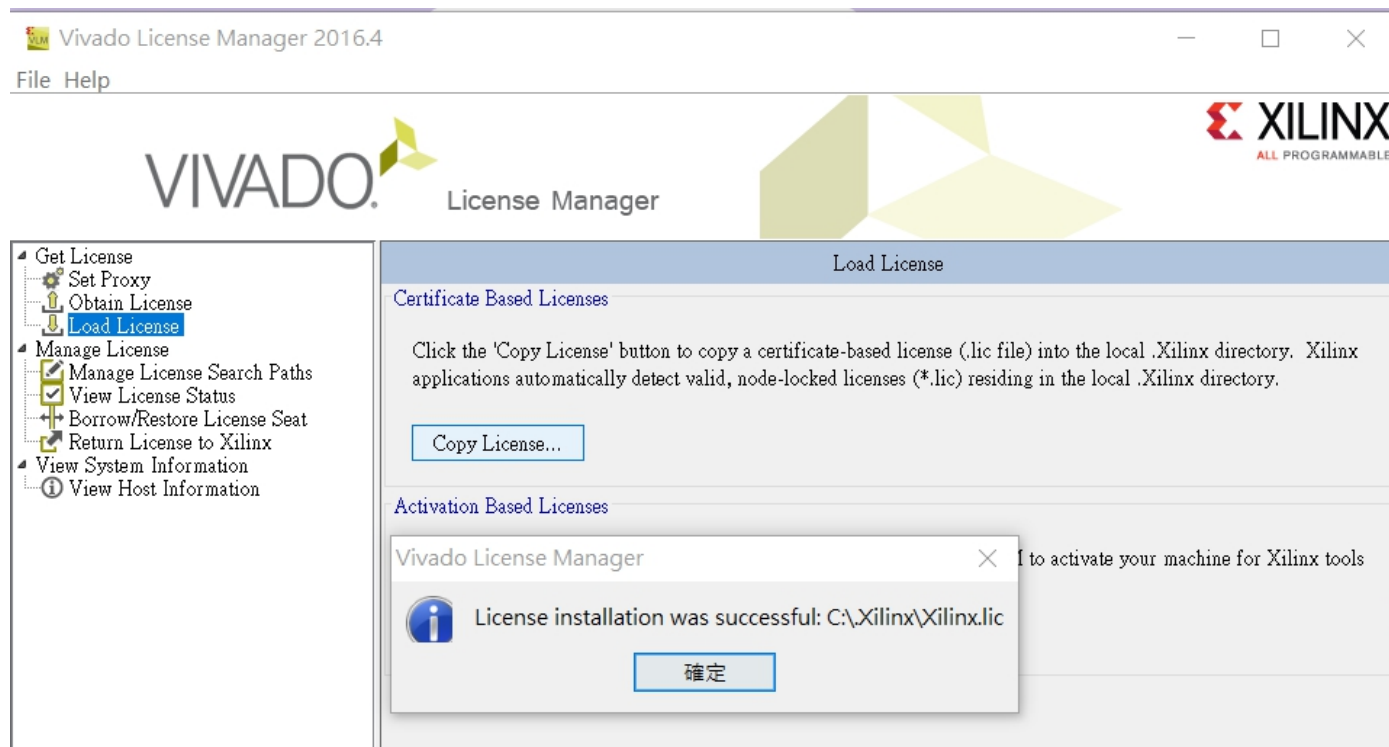
- 選擇第三個選項（全選也可以）產生並下載 license
- 信箱會收到 license 的使用教學

<input type="checkbox"/> ISE Embedded Edition License	Certificate - No Charge	Node	1/1	Current	None
<input type="checkbox"/> Model Composer : 90-day Evaluation License	Certificate - Evaluation	Node	1/1	Current	90 days
<input type="checkbox"/> Vivado Design Suite: 30-Day Evaluation License	Certificate - Evaluation	Node	1/1	Current	30 days
<input type="checkbox"/> SDSoC Environment, 60 Day Evaluation License	Certificate - Evaluation	Node	1/1	Current	60 days
<input type="checkbox"/> SDAccel OpenCL Development Environment: 30 Day Node Locked Evaluati...	Certificate - Evaluation	Node	1/1	Current	30 days
<input type="checkbox"/> Vivado Design Suite: HL WebPACK 2015 and Earlier License	Certificate - No Charge	Node	1/1	Current	None
<input type="checkbox"/> ISE WebPACK License	Certificate - No Charge	Node	1/1	Current	None
<input type="checkbox"/> Xilinx MicroBlaze/All Programmable SoC Software Development Kit – Stand...	Certificate - No Charge	Node	1/1	Current	None
<input type="checkbox"/> PetaLinux Tools License	Certificate - Evaluation	Node	1/1	Current	365 days
<input type="checkbox"/> Vivado HLS Evaluation License	Certificate - Evaluation	Node	1/1	Current	30 days

Vivado 安裝

5. Vivado License Manager

- 點 Load License，Copy 剛剛下載的 license，跳出安裝成功即完成。



NEXYS 4 DDR

1. NEXYS 4 DDR Features

- <http://www.xilinx.com/products/boards-and-kits/1-60lhw1.html>

2. Nexys 4 DDR Resource Center

- <https://reference.digilentinc.com/nexys4-ddr:start>
- (Manual , XDC, UCF...)

