ISE/iMPACT FLASH HOWTO

How to write the DarkRISCV on FPGA FLASH!

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ISE/iMPACT FLASH HOWTO

Before start…

- You need install Xilinx ISE 14.7
- You need install Vivado 2018.2 or better, in order to use modern JTAG device drivers (i.e. we will use Vivado drivers on ISE/iMPACT)
- A board with Xilinx FPGA + FLASH
- A JTAG adapter compatible w/ Xilinx tools

ISE/iMPACT FLASH HOWTO

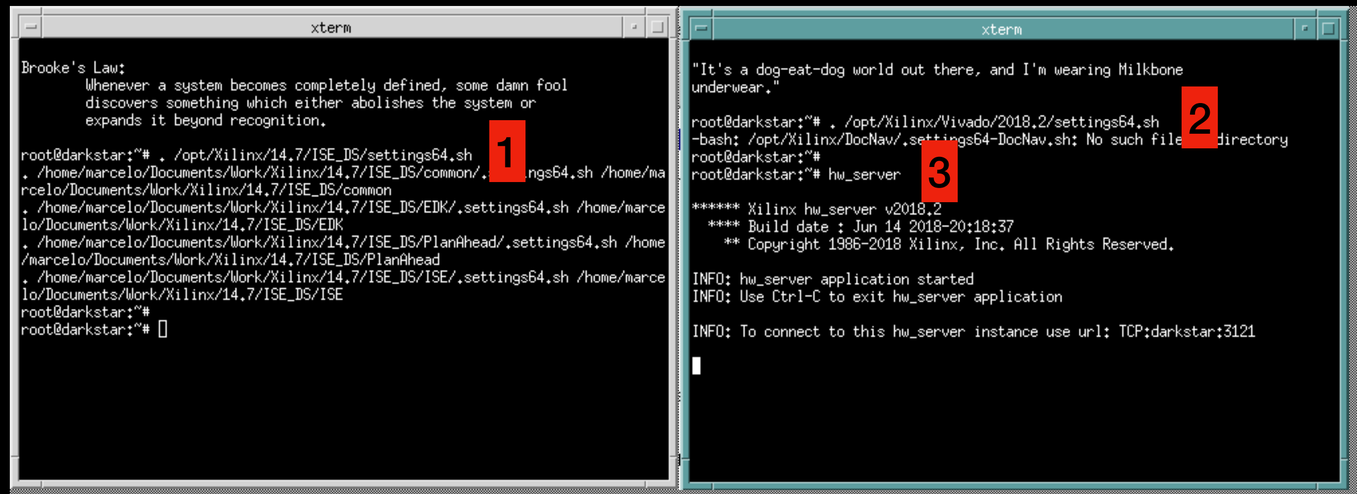
Extra tips before start…

- Xilinx ISE/iMPACT is hard to make work on Windows, to the Linux version is recommended… case you have no Linux, you can use WSL1 on Windows.
- Vivado works correctly on both Windows and Linux.
- Identify the FLASH model and size before start, because you will need such information ahead!

ISE/iMPACT FLASH HOWTO

ISE/Vivado Environments

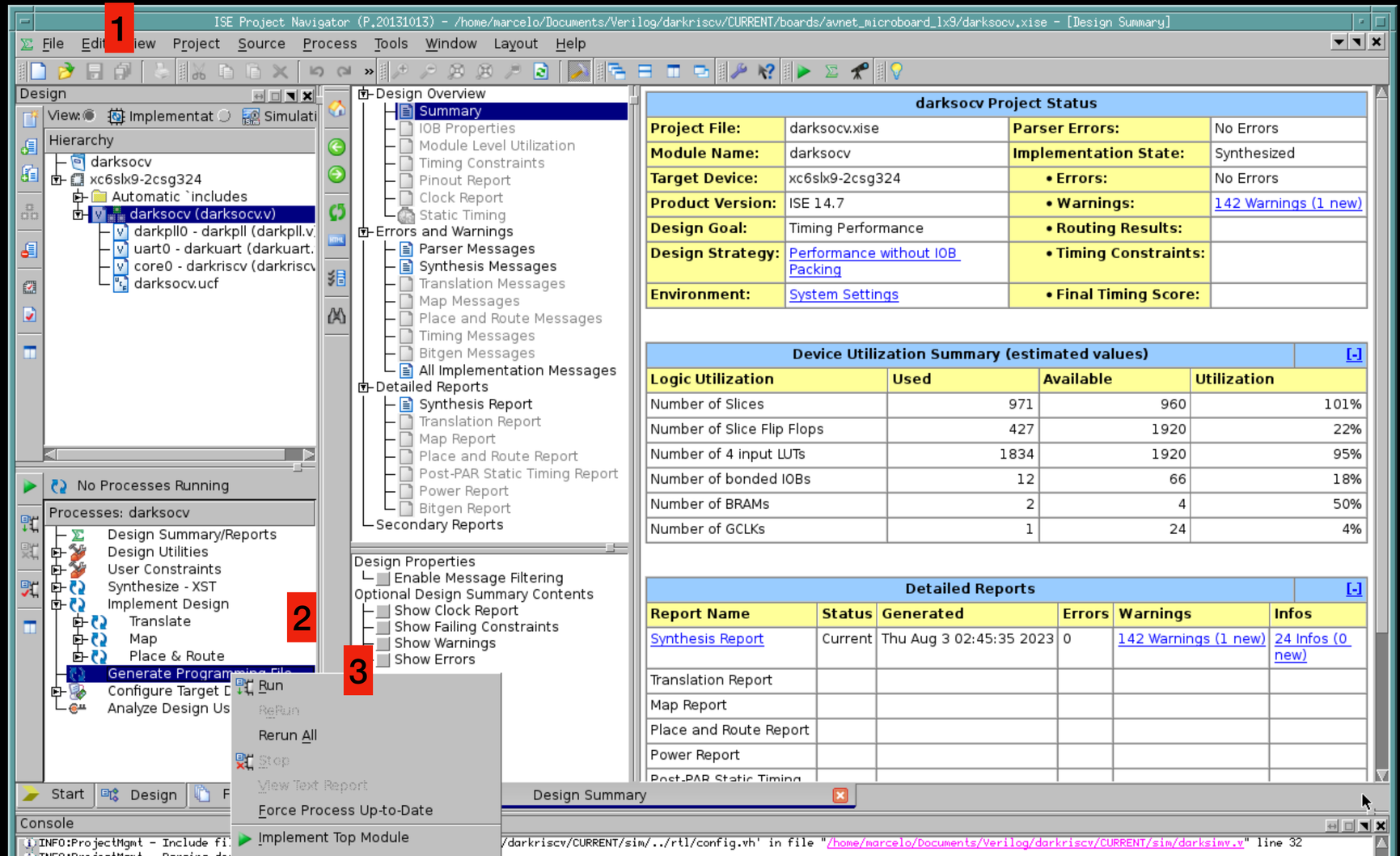
- Start two separated terminals and load the environment scripts for ISE (1) and Vivado (2) separately in each terminal
- Start the “hw_server” on the Vivado terminal and keep it running…



ISE/iMPACT FLASH HOWTO

Preparing the FPGA image

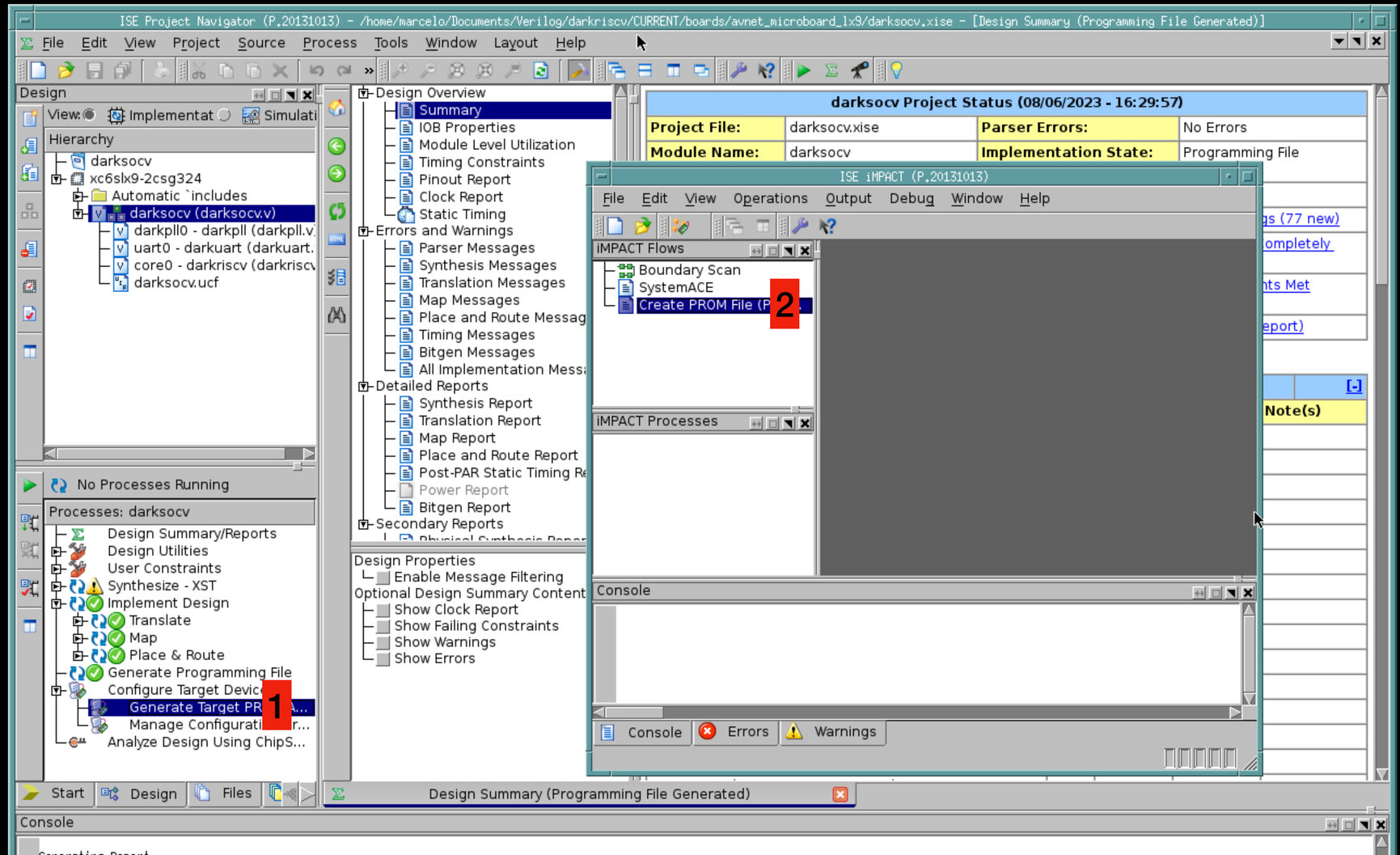
- Start ISE w/ “ise" command on the ISE terminal, open your project on "File/Open Project” (1), click w/ left button on “Generate Programming File” (2) and click on “Run” (3)
- ISE will build your FPGA image…



ISE/iMPACT FLASH HOWTO

Preparing the FLASH image

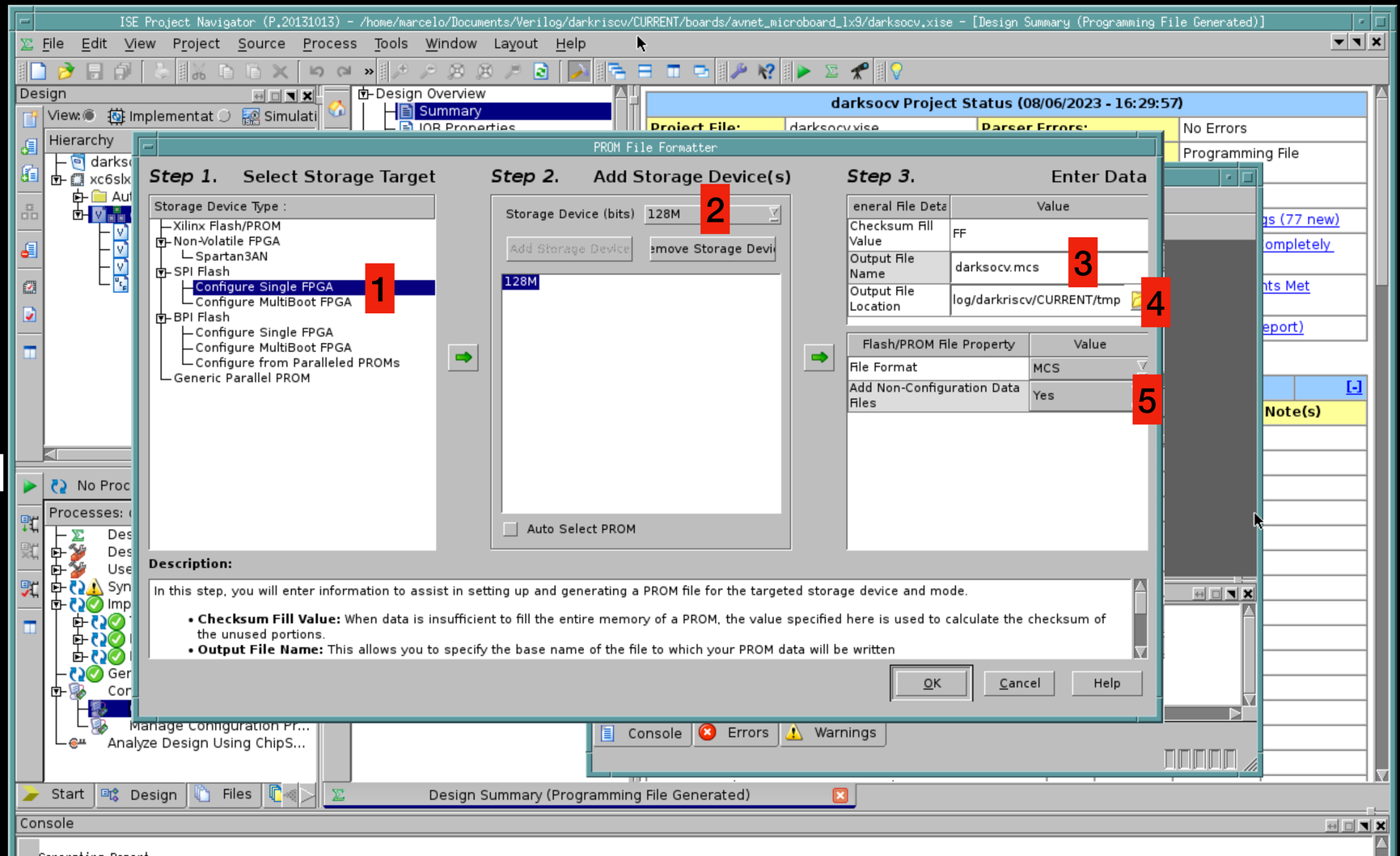
- After ISE concludes the FPGA build, open the option “Configure Target Device” and double-click on “Generate Target PROM” (1).
- It will open iMPACT, select “Create PROM File” (2)



ISE/iMPACT FLASH HOWTO

Preparing the FLASH image

- Select “Configure Single FPGA”(1), select storage size, in this case 128Mbit (2), select the output name “darksocv.mcs” (3), the output path (4) and set the non-configuration files to “Yes” (5)



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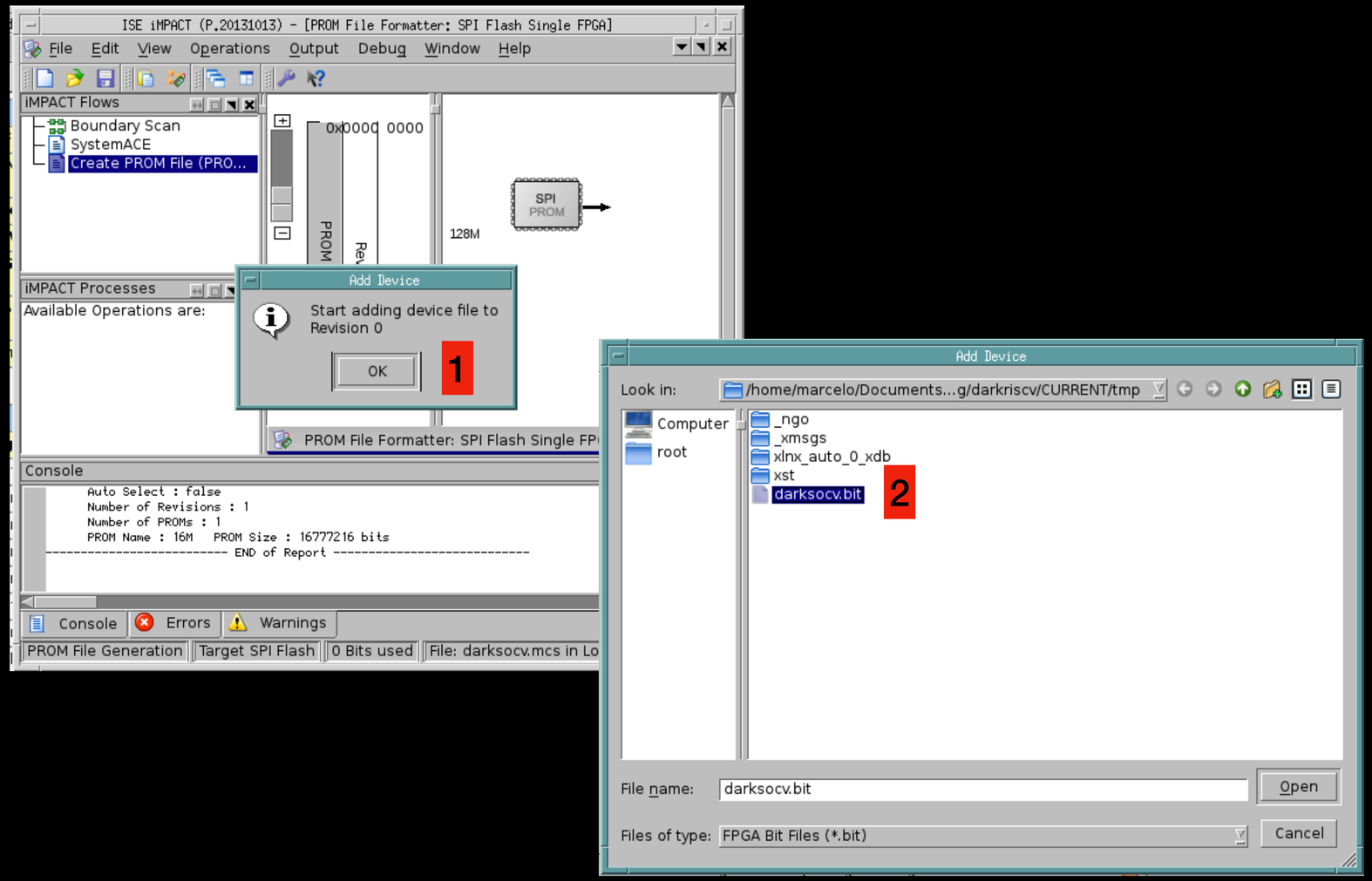
Preparing the FLASH image

- Just click ok for the Revision 0 (1) and select the FPGA boot image (2), in this case, the darksocv.bit that we generated before



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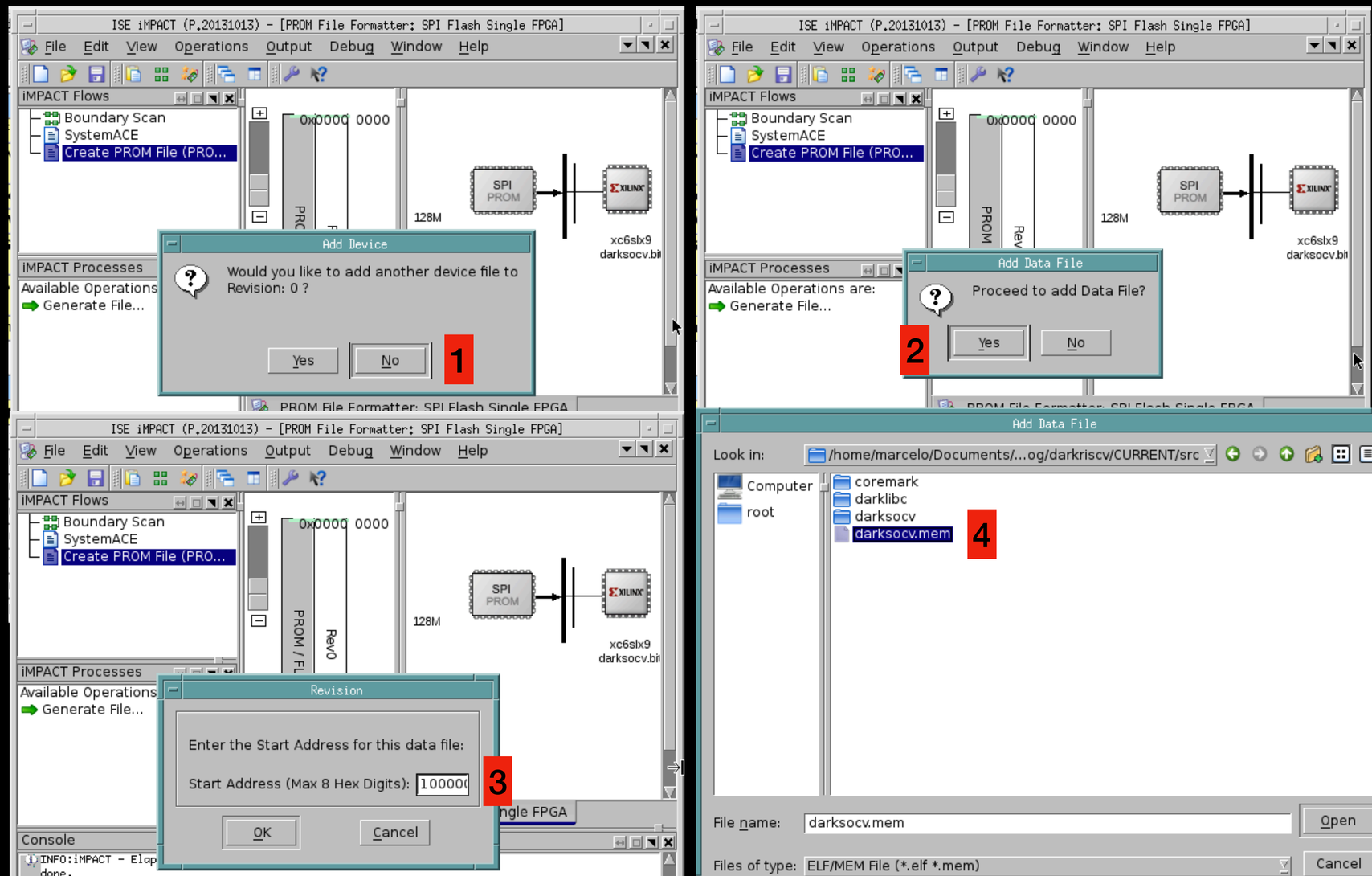
Preparing the RISC-V image

- Click on “No" to not add other boot FPGAs (1), click “Yes" to proceed to add data files (2), enter the data file start address (3), in this case 100000 means 1M and select the data file (4), in this case the darksocv.mem RISC-V image.



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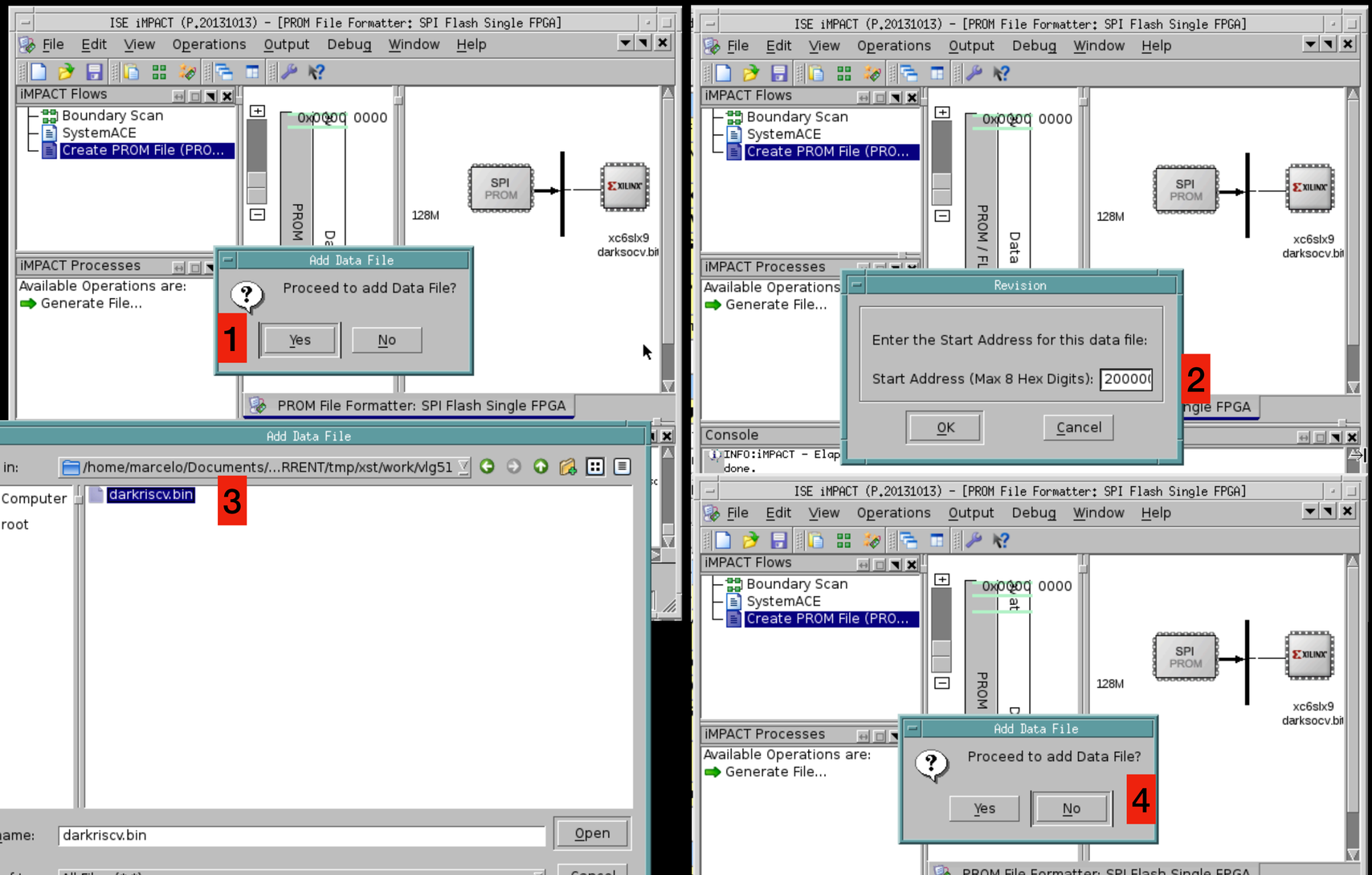
Adding extra stuff (files, filesystem, etc)

- You can continuously click “Yes" to proceed to add more data files (1), incrementing the start address (2), selecting the file (3), etc…
- Case you need no more files, click “No" (4)



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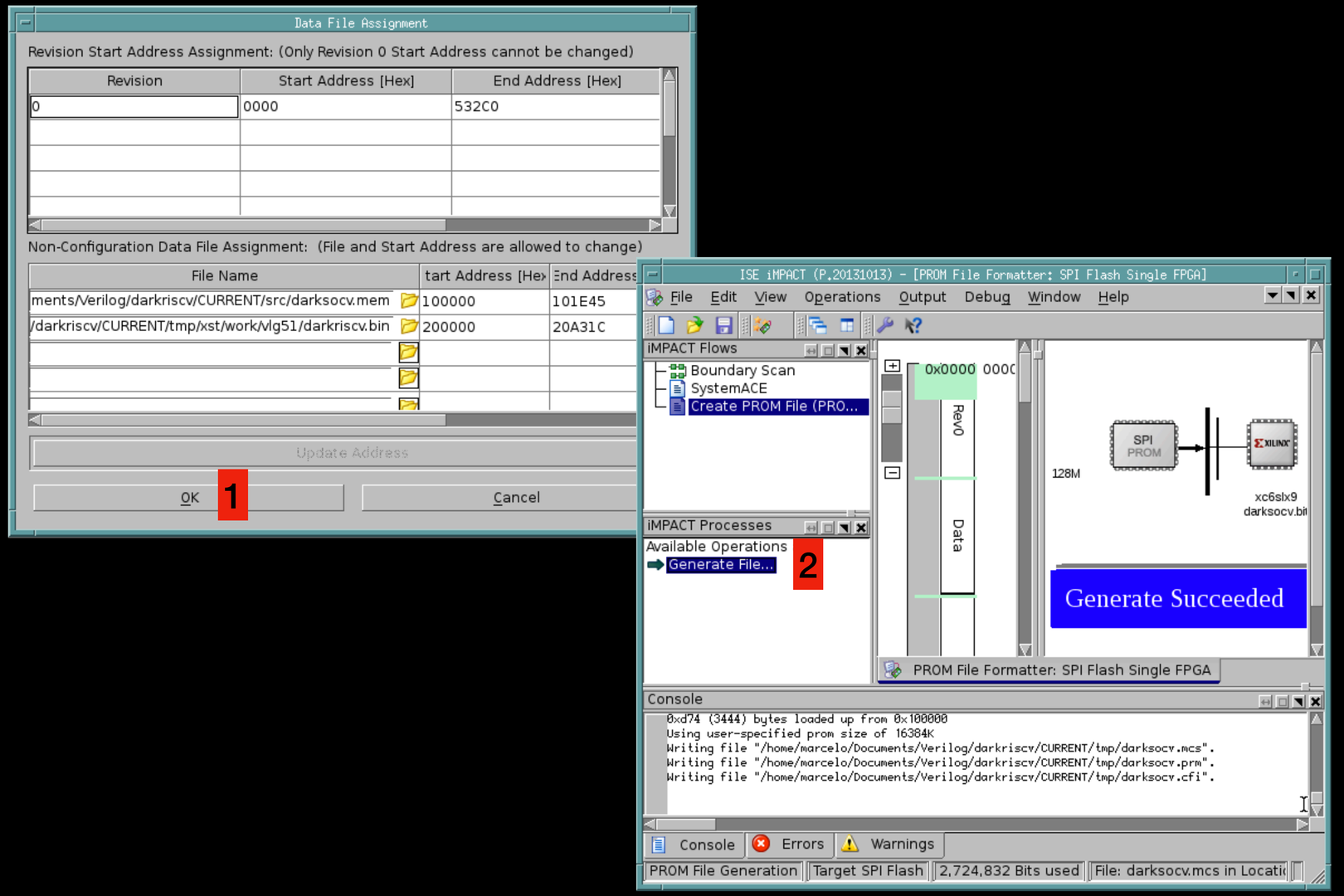
FLASH Summary

- The tool will generate a summary, in a way you can review the file and offsets on the flash… case everything is ok, click “OK” (1) and double-click on “Generate File” (2) to generate the MCS file!



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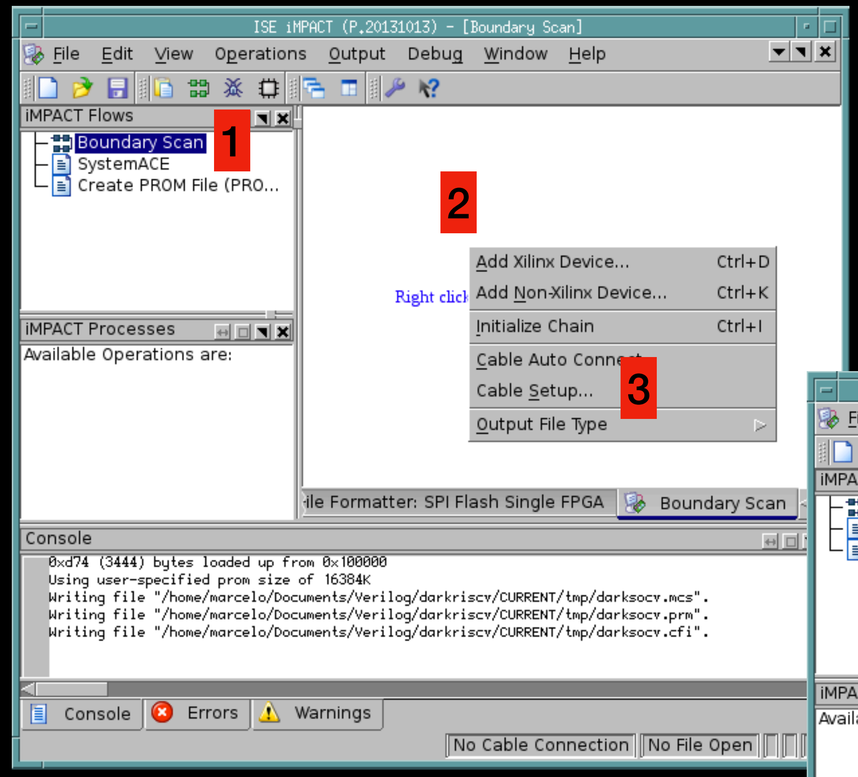
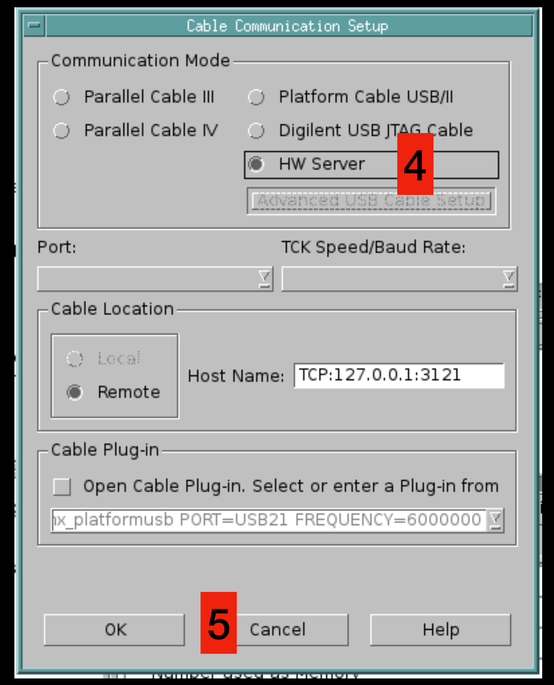
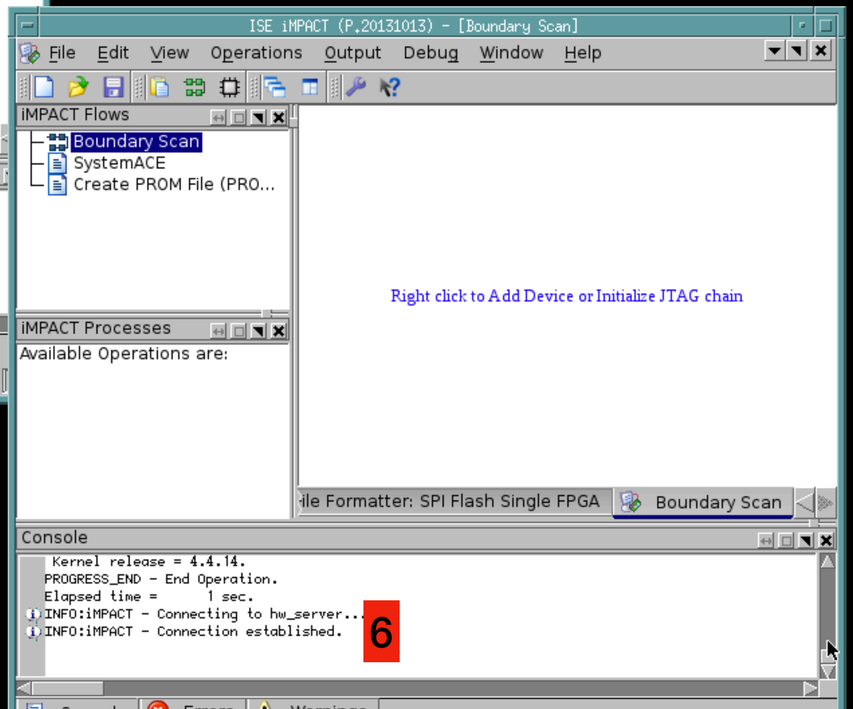
Adding the JTAG adapter…

- Double-click on “Boundary Scan” (1), right click on blank space to open the menu (2) and select “Cable Setup (3).
- Select “HW Server” (4) to use the Vivado server and click “OK" (5), the Console must show “Connection established” (6)



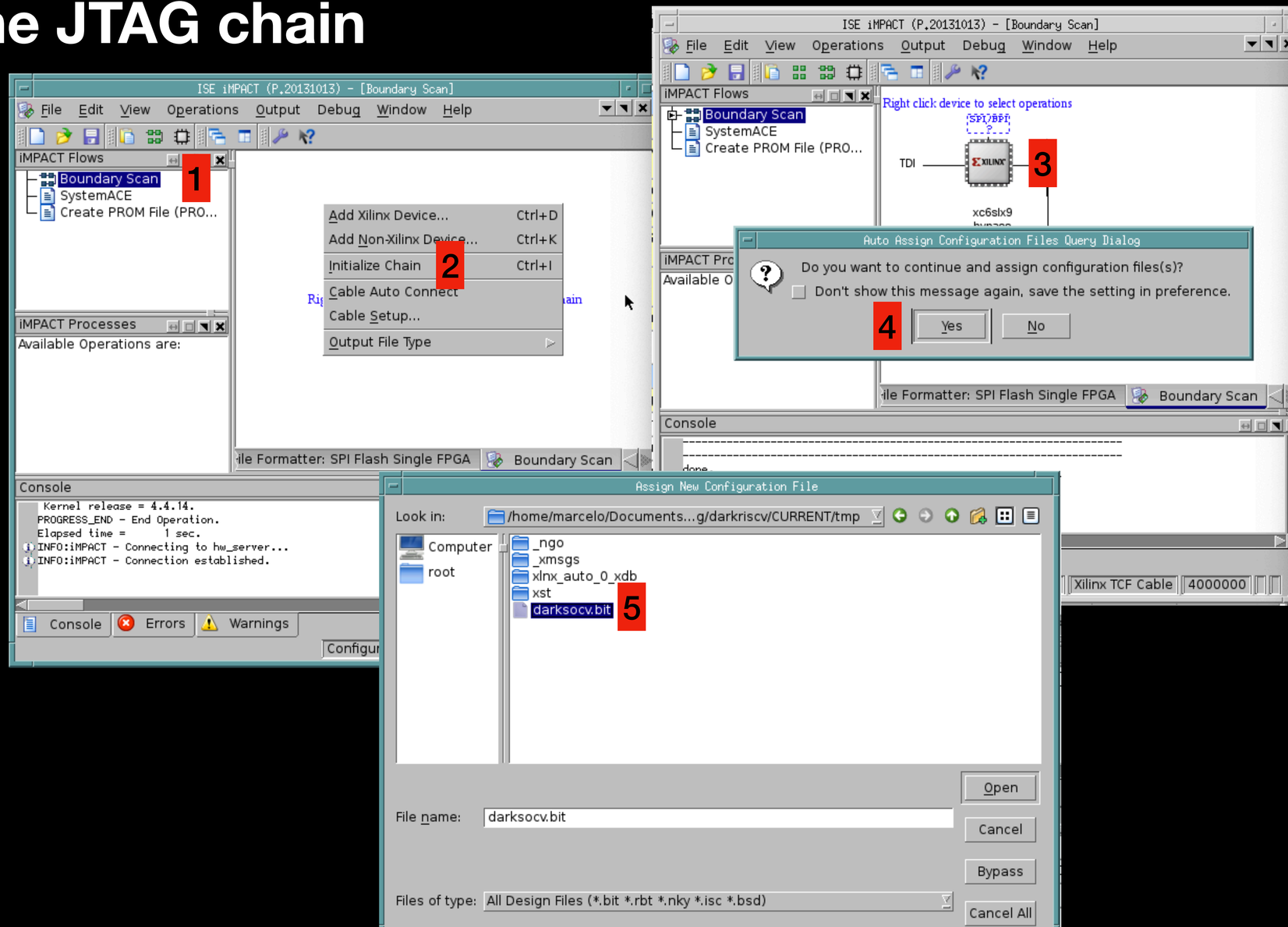




ISE/iMPACT FLASH HOWTO

Adding the FPGA on the JTAG chain

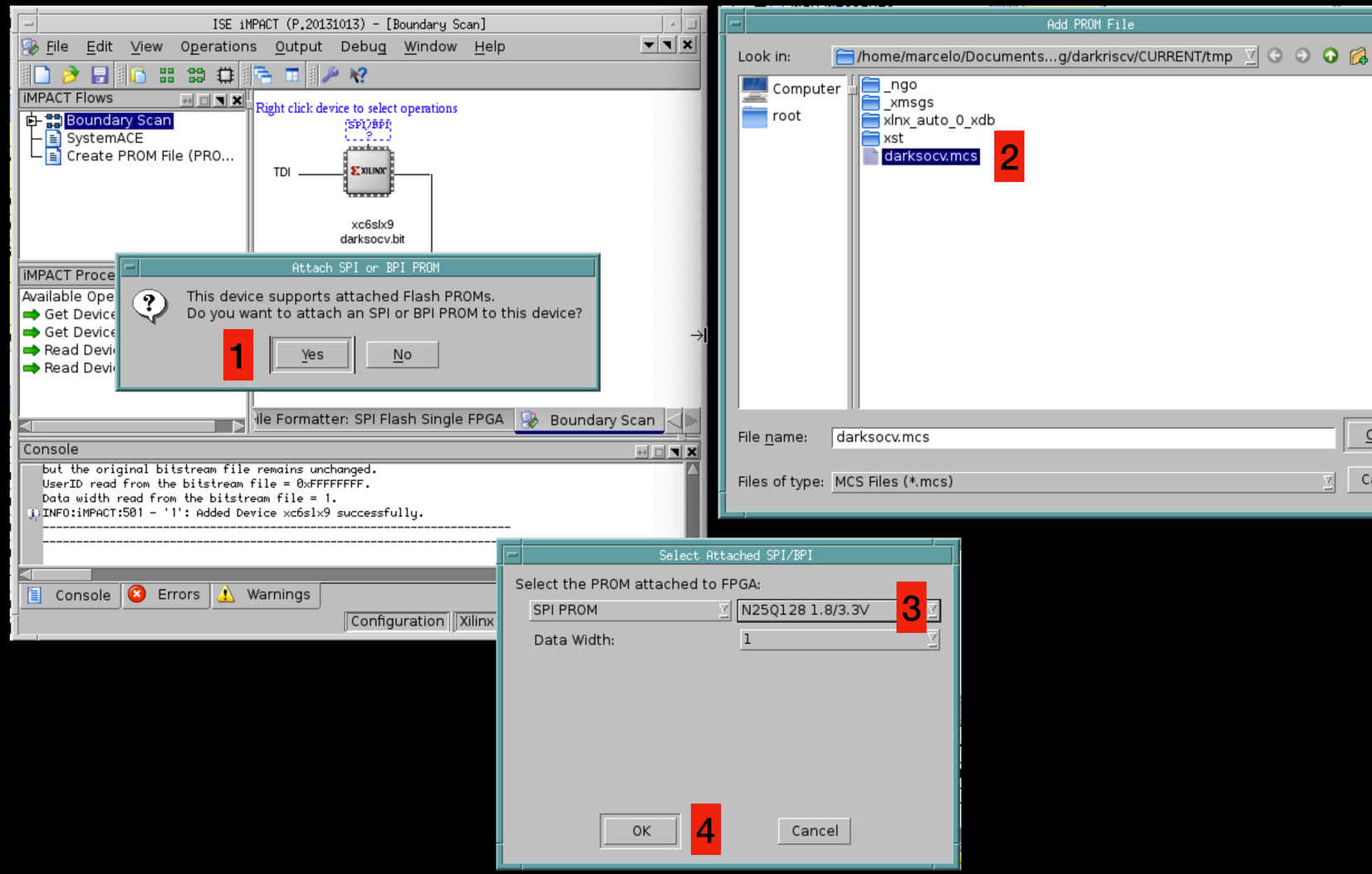
- Right click on blank area to open the menu (1) and select “Initialize Chain” (2), it will automatically identify the FPGA (3) and ask about a FPGA image, click “Yes" (4) and select the FPGA image that you generated moments before (5)



ISE/iMPACT FLASH HOWTO

Adding the FLASH on the JTAG chain

- The tool will ask about the FLASH, click “Yes" (1) and select the MCS file that you generated before (2)
- The tool will ask about the FLASH model (3), select the correct model and click “OK” (4)



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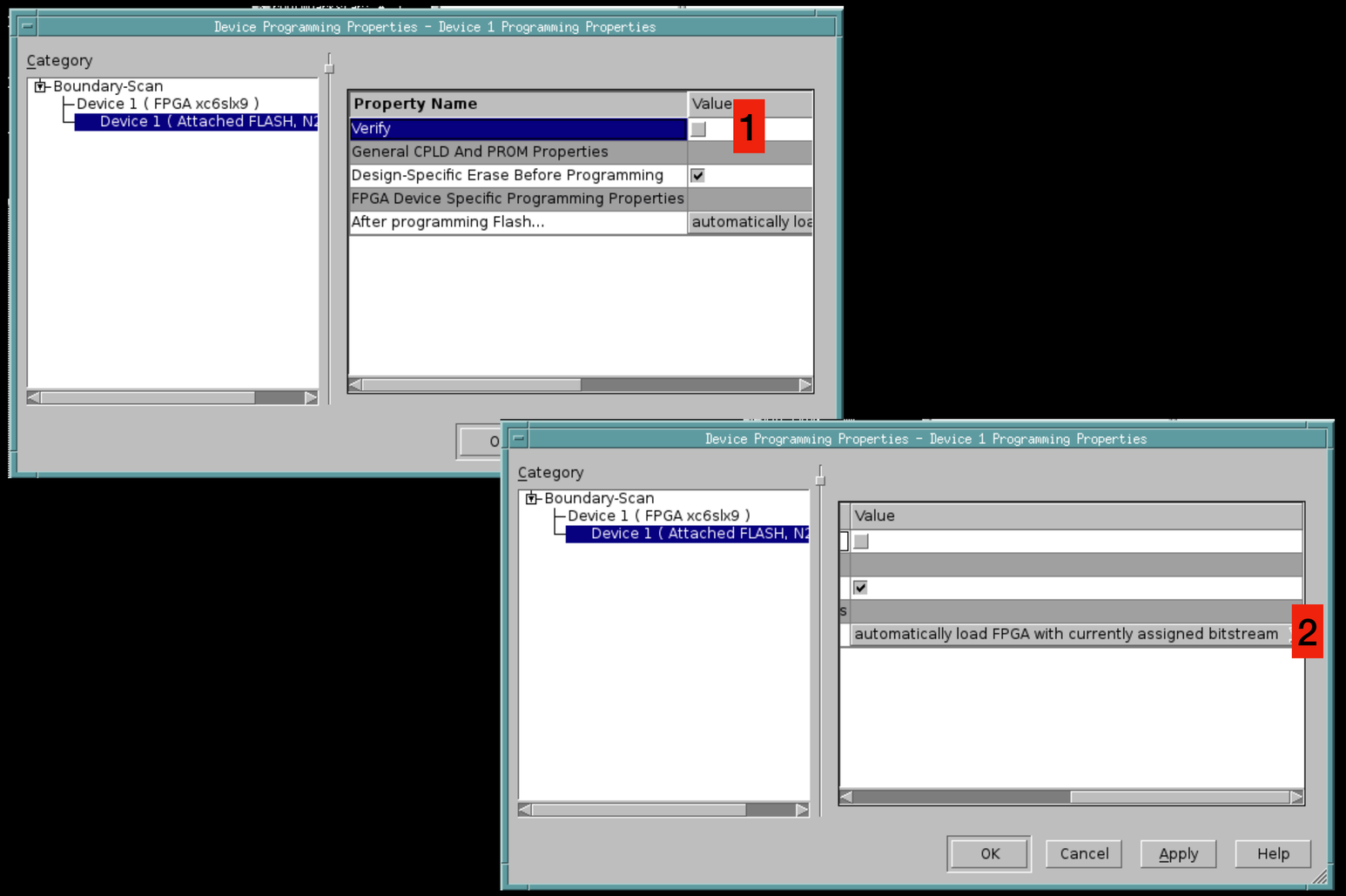
Adding the FLASH on the JTAG chain

- The tool will ask about how to program the device, uncheck the “Verify” option (1) in order to make it work faster!
- You can also select to load the assigned bitstream after programming, also to make it faster (2)



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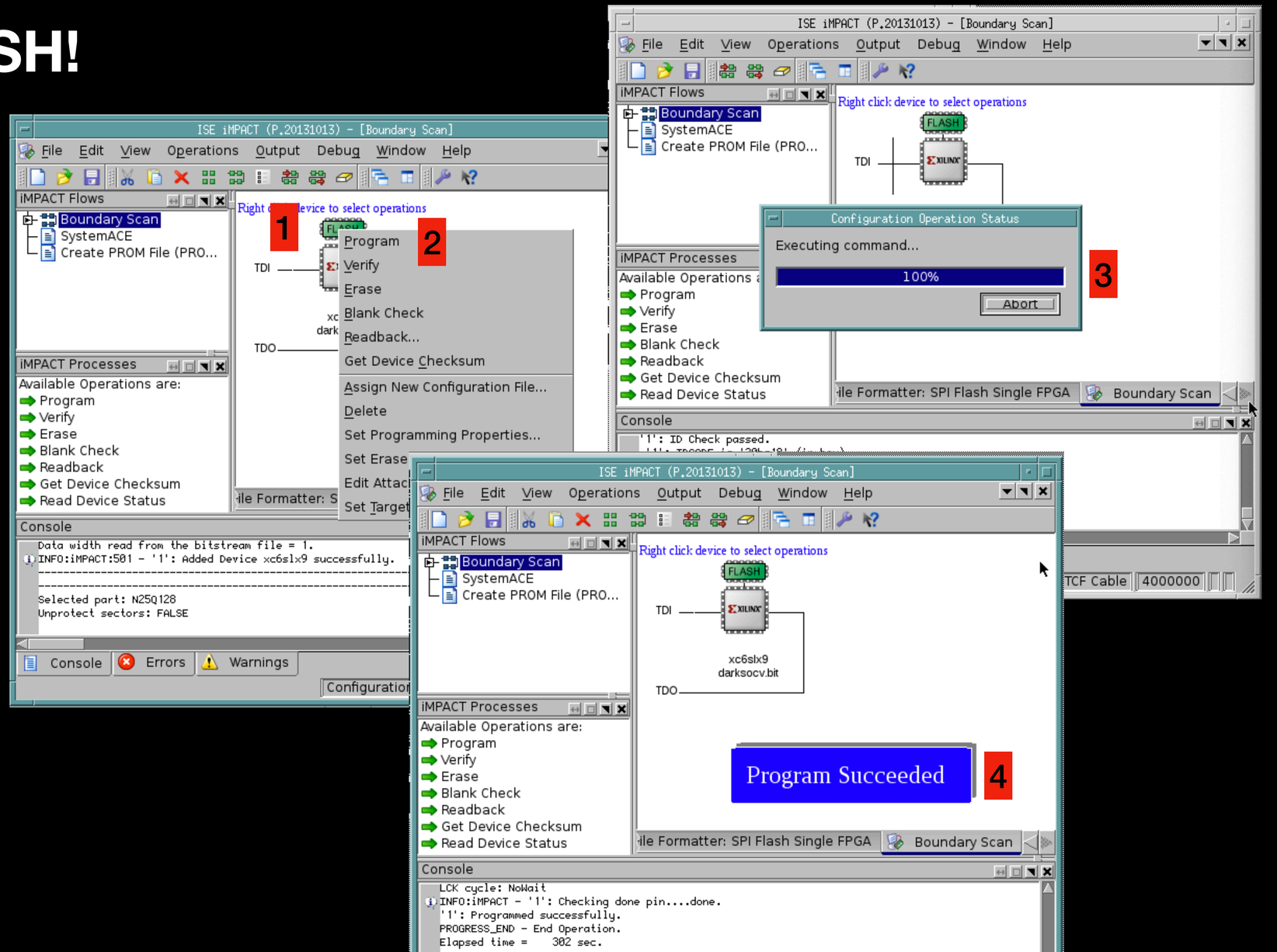
Programming the FLASH!

- Right click on the FLASH (1) to open the menu and click on “Program” (2).
- The tool will take a while to erase and program the FLASH (3)…
- When the tool is ready, it will show “Program Succeeded” (4)



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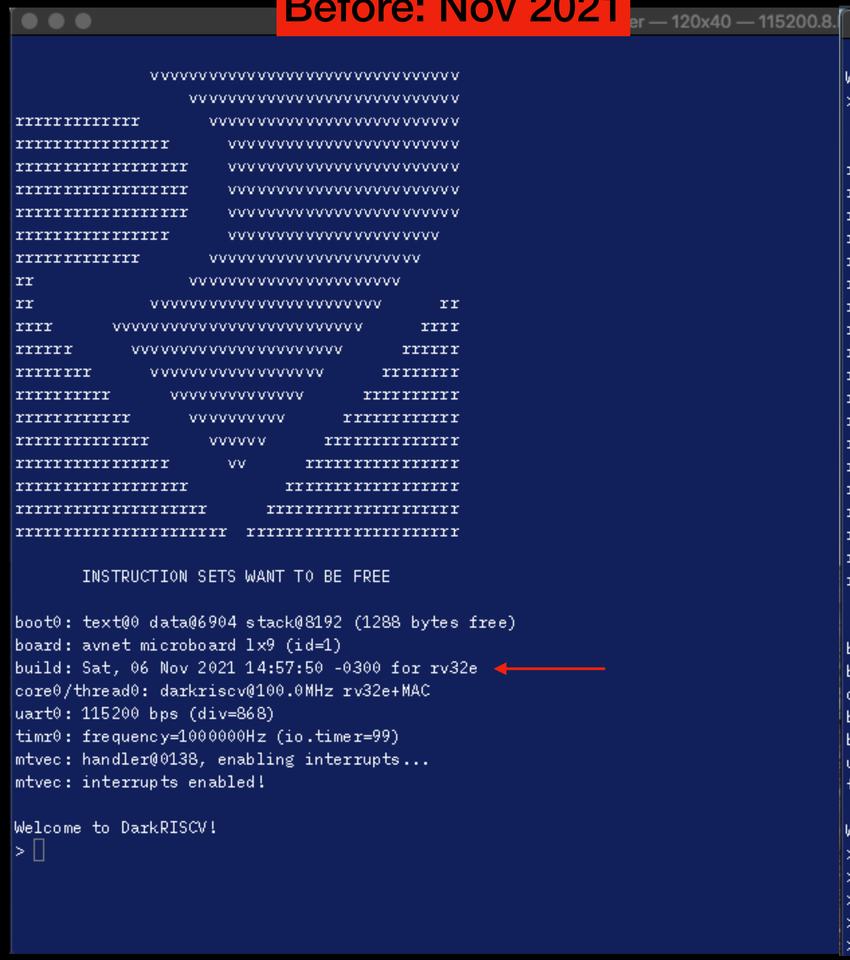
Checking the results…

- You can keep a terminal attached all time, so you can check before and after the programming…
- Just in case, reset or power cycle your board and check the compilation dates and good lucky!

Before: Nov 2021



After: Jul 2023