Intel FPGA Cloud Services and Remote Access Methods

FCCM Conference 2021

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Intel® FPGA Academic Ecosystem

- Train the next generation of FPGA Designers
- Increase Intel® FPGA presence in academia

- Academic access to the latest generation of Intel FPGAs

- Nurture the talent pipeline for Intel and our customers
- Engage research on Intel FPGAs

Undergraduate Teaching Resources for Computer Engineering Profs and TAs

Intel® FPGA EE Undergrad Coursework Offerings

- Undergraduate
  - Digital Logic
  - Digital Systems
  - Computer Organization
  - Embedded Systems

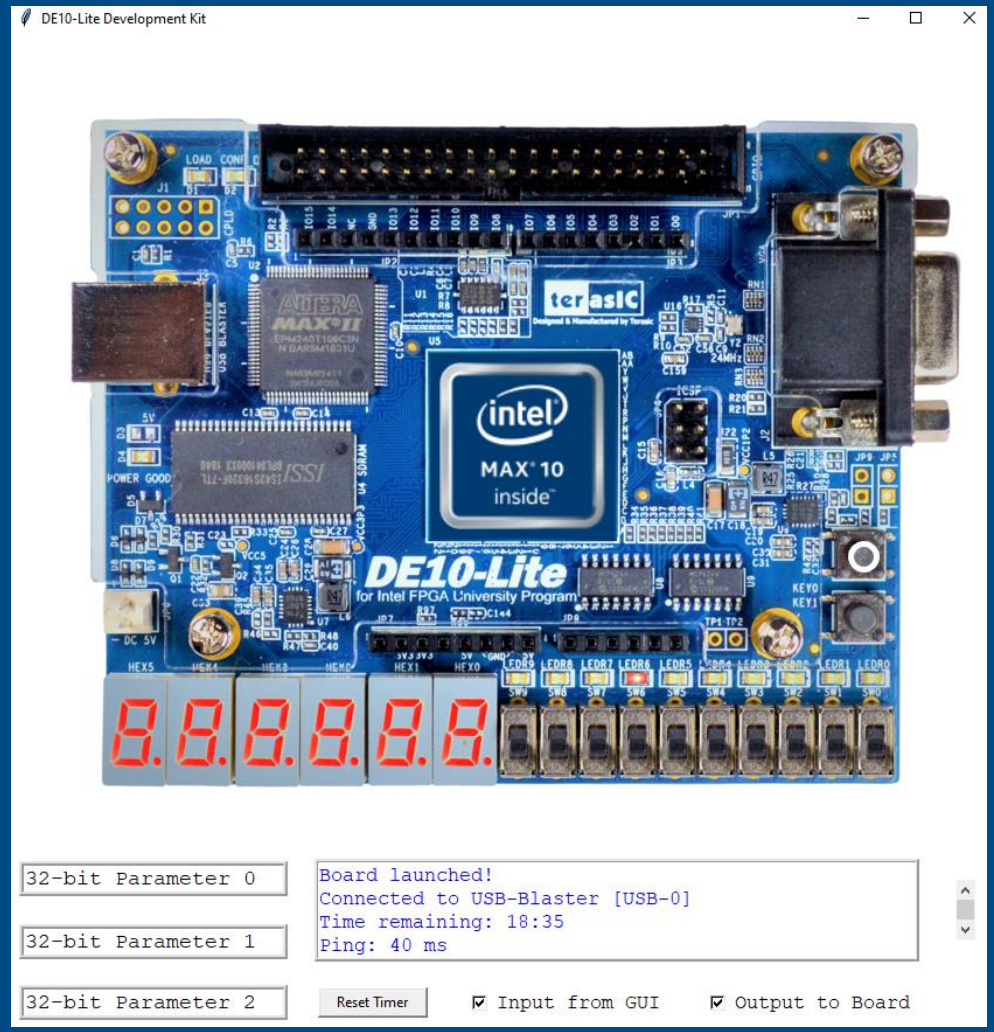
What's included?

- Tutorials on tool usage
- Semester worth of labs

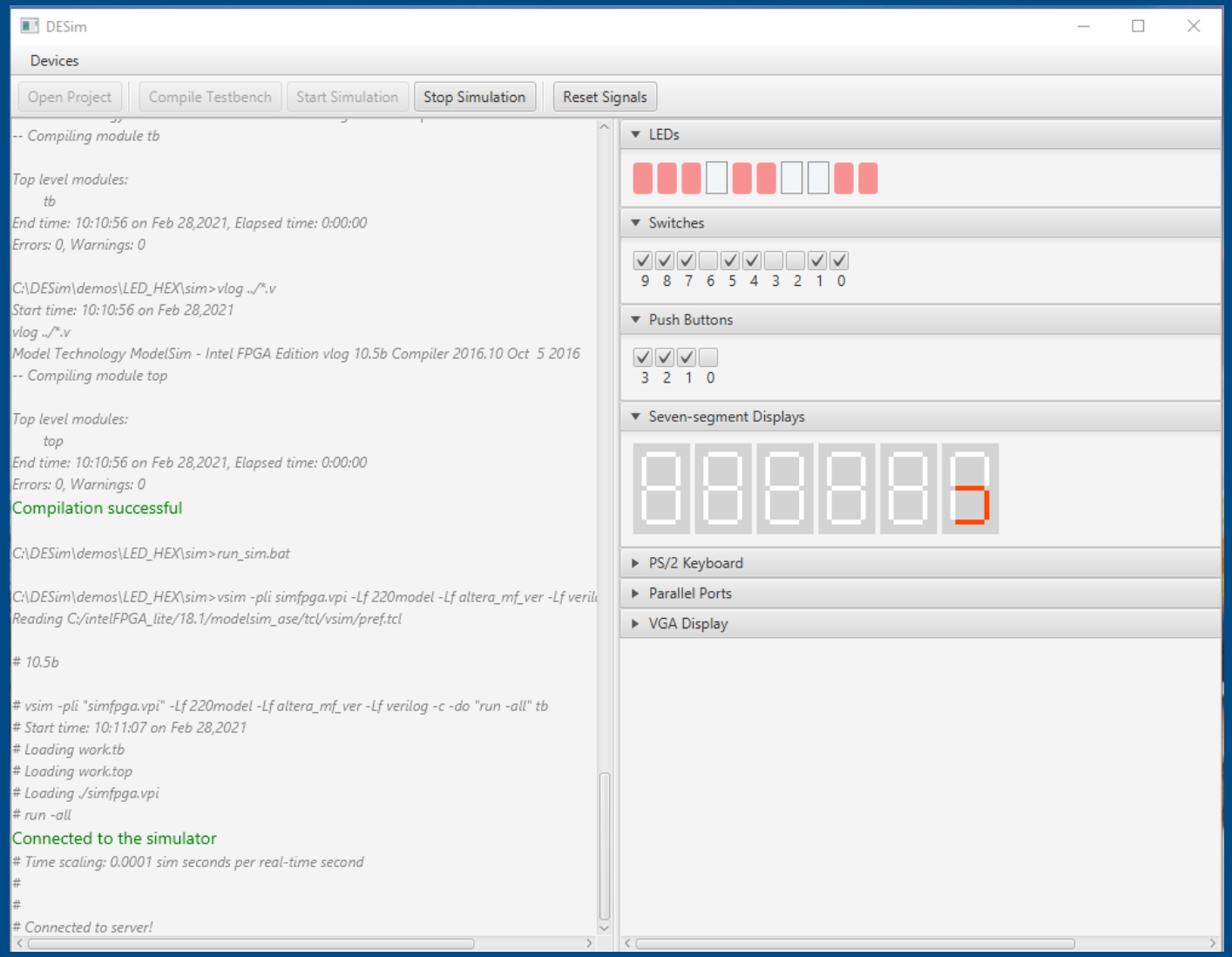
http://fpgauniversity.intel.com

Remote Learning Tools for Undergrad Coursework

- DESim
  - Devkit GUI runs Modelsim simulator. No testbench required. Great for first time learners of Verilog/VHDL for introductory labs. No hardware required.
- Remote Console
  - “Video game” like GUI that connects to Terasic development kits
  - Enables remote hosting of boards – ideal for work from home environments



DESim – Simulator Console



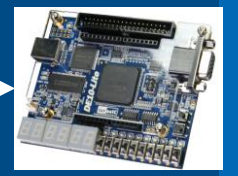
- DESim
  - Student prepares Verilog/VHDL code
  - Prof provides testbench and student can observe behavior through GUI – great for new learners to visualize logic design behavior

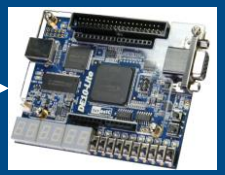
https://github.com/fpgacademy/DESim/releases/tag/v1.0.1

Remote Console

Linux or Windows*
Server

USB





Method 1: Intel Quartus® Prime Software Hosted on Server

-or-

Method 2: Intel Quartus® Prime Software Hosted on Student's PC

Does not require 1 Devkit per Server – use USB port replicator

Install setup at university engineering department cluster

Host on Windows or Linux server running Intel Quartus Prime Programmer

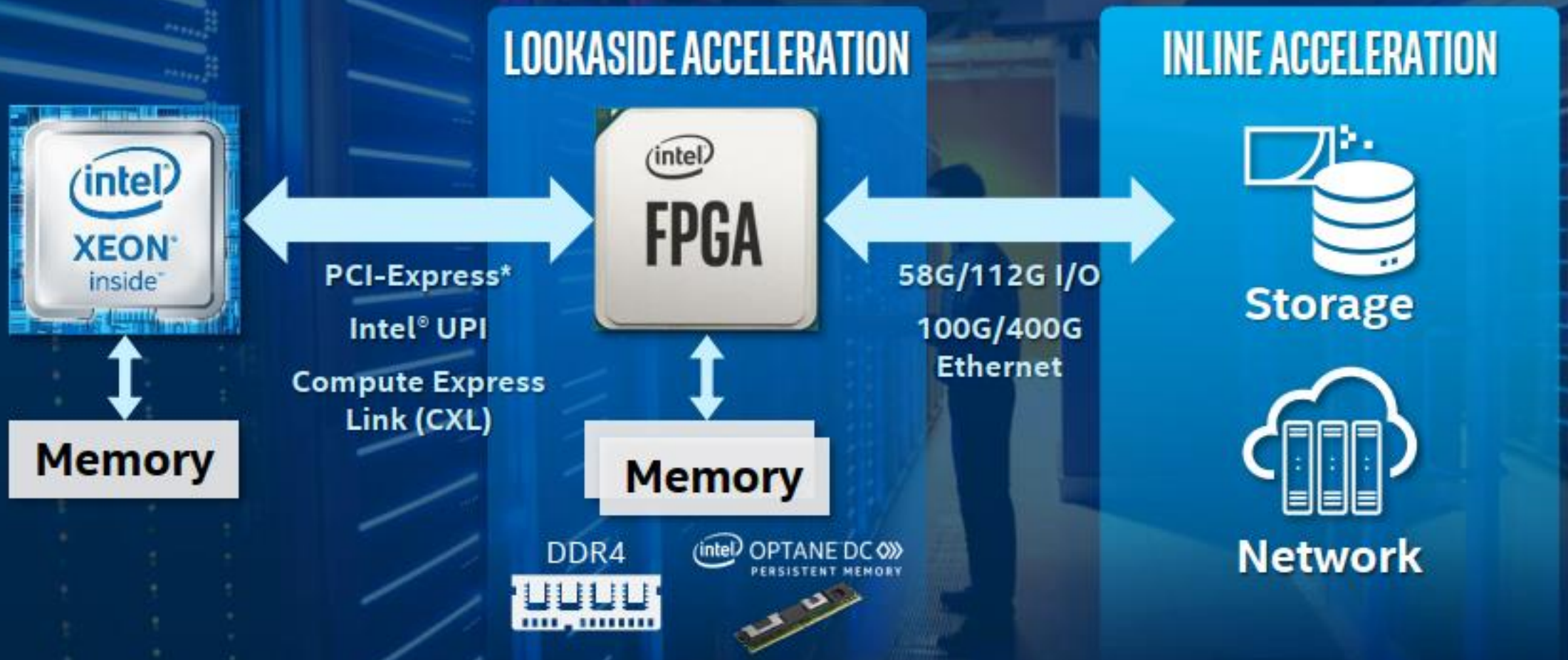
https://github.com/intel/FPGA-Devcloud/tree/master/main/HandsFree

Labsland

- Labsland is a company with an installation of remotely hosted labs using video cameras on a variety of scientific topics, including Intel FPGAs
- Utilize learning institutions to host the remote labs, and labsland collects a per student fee to access the remote learning setup.
- Host sites get free access to the remote labs. Please visit the labsland.com site for demonstrations of their remote FPGA board solution

Graduate Level and Research: Intel Devclouds and HARP

INTEL® FPGAS ACCELERATING THE CLOUD & ENTERPRISE



Intel FPGA University Graduate Level Coursework

- Graduate level FPGA coursework focuses on AI, Machine Learning, Heterogeneous Computing using C++ extension languages: HLS, OpenCL, DPC++ and OpenVino for Visual Inferencing
- Run a web search on Intel FPGA Training for various topics
- Partner university links for FPGA devcloud coursework through Mindshare Grants:
  - U of Florida – RTL AFU
  - U Mass Lowell – OpenCL / OpenAPI
  - UC Davis - OneAPI
- Intel offers **free** FPGA HARP (aka vlab) for Research or Devcloud (Teaching) cloud services

Intel FPGA Academic Clouds

Cloud access to Intel servers with FPGAs for academics

FPGAs/SW tools already installed. Just login remotely. Ready to use!

HARP (vlab) for long-term research

Hardware accelerator research program (HARP), originally offered cloud access to integrated (MCP) Xeon+FPGA

Now expanded to offer servers with FPGAs cards, hosted in Intel's Academic Compute Env.

Exclusively for long-term academic research (e.g., 1+ year PhD research)

DevClouds for teaching and beyond

Offers servers with FPGA cards

Suitable for teaching (e.g., lab projects) and short-term research efforts. Move to HARP when research grows

And for short-term development projects in general (academic and industry)

What's available

FPGA flows/framework	Devcloud	HARP
Traditional RTL flow	Y	Y
HLS Compiler	Y	Y
FPGA SDK for OpenCL	Y	Y
DPC++ (part of OneAPI)	Y	Upon Request
OpenVino (AI framework)	Y	Upon Request

FPGA hardware

- Intel Xeon with Arria 10 Programmable Acceleration Cards (PAC)
- Intel Xeon with Stratix 10 Programmable Acceleration Cards (PAC)
- 10nm Agilex coming soon!
- Integrated Xeon+FPGA systems (HARP only)

HARP: Getting access

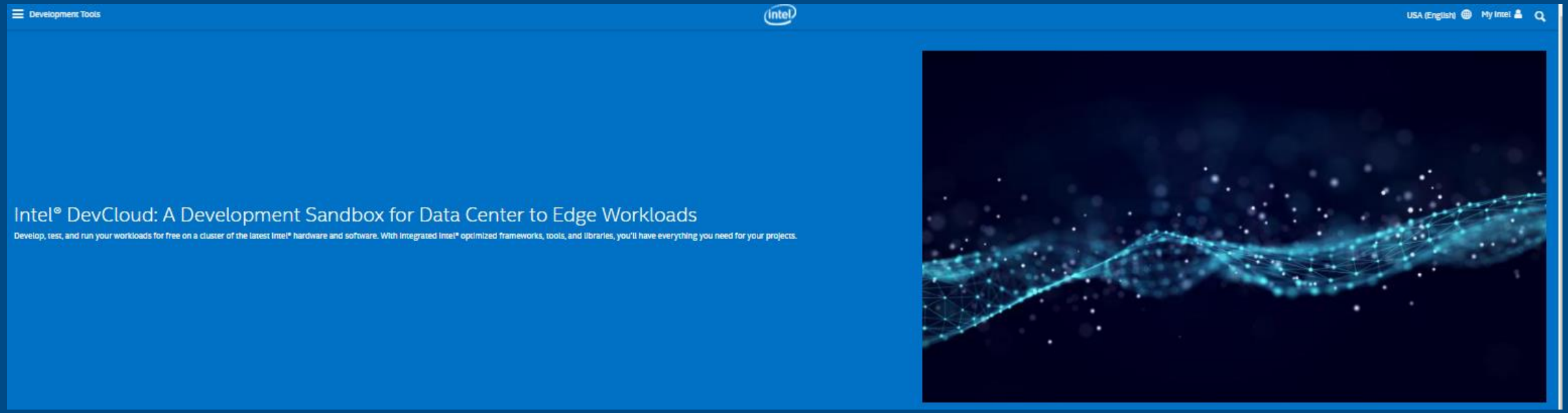
To get access

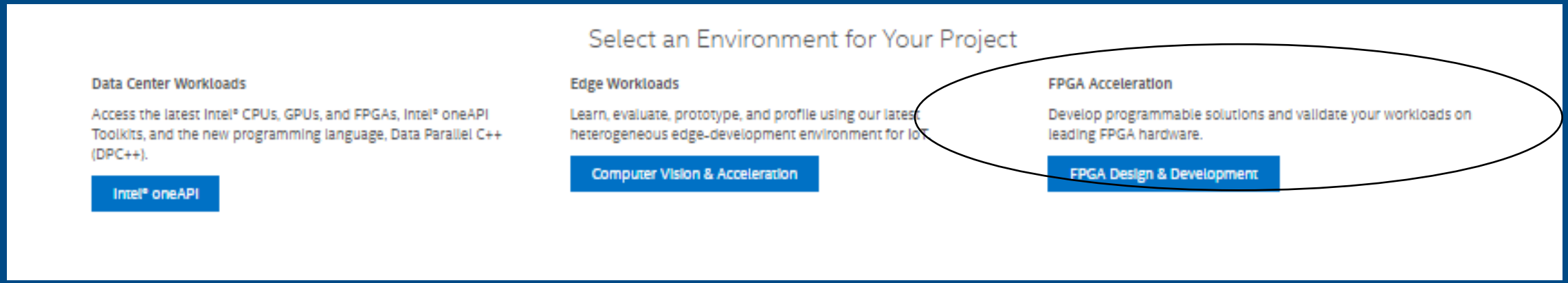
Send email to: IL_Academic_Res_Env@intel.com
Put email subject “[HARP] new account request”.
Include a short (1 page max) research proposal
Include the type of workloads you are planning to run

More details

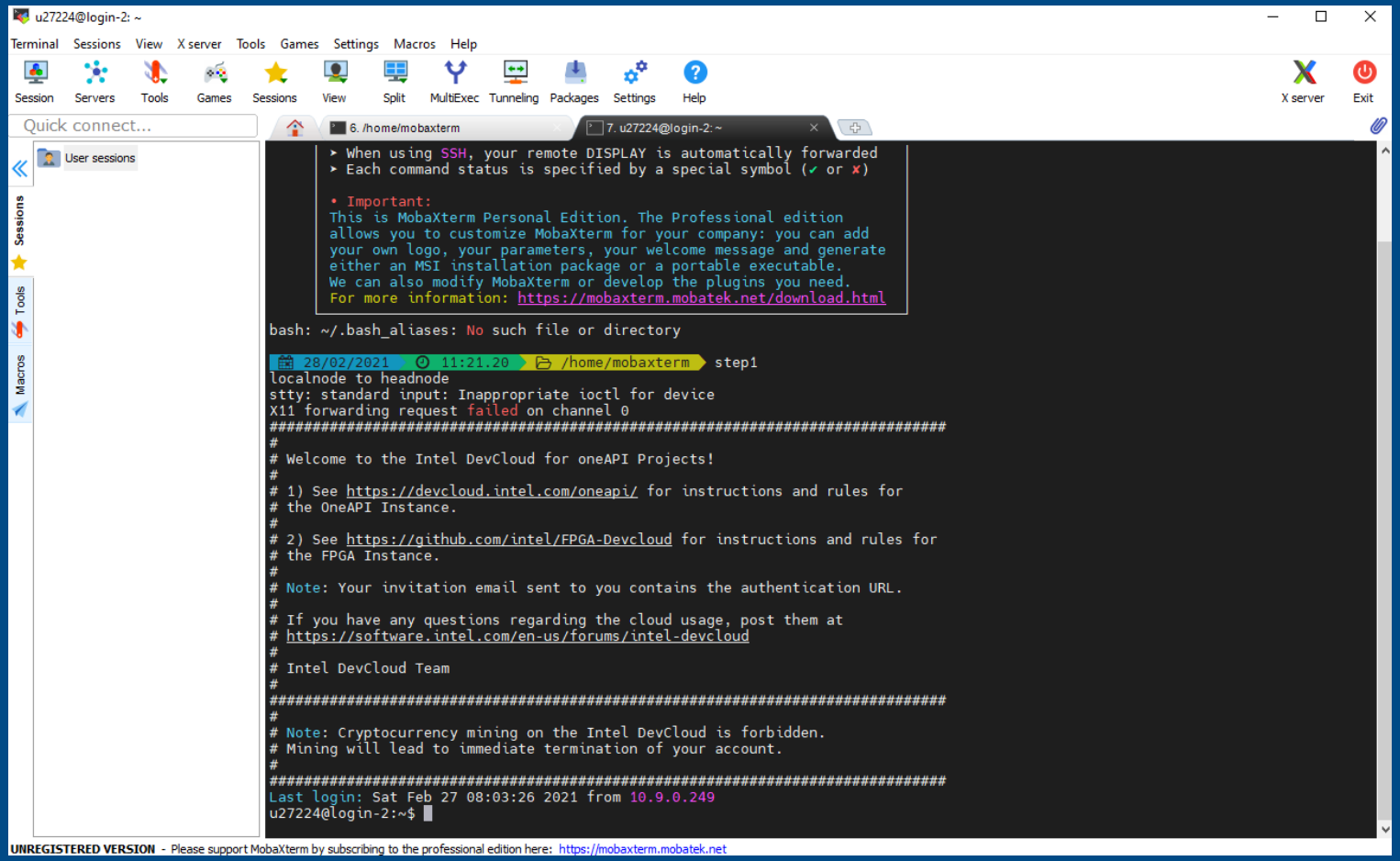
The following website offers information of available FPGA systems in HARP. It also provides detailed tutorials and examples on how to get started.
https://wiki.intel-research.net/FPGA.html

Website Access for the Intel Devclouds



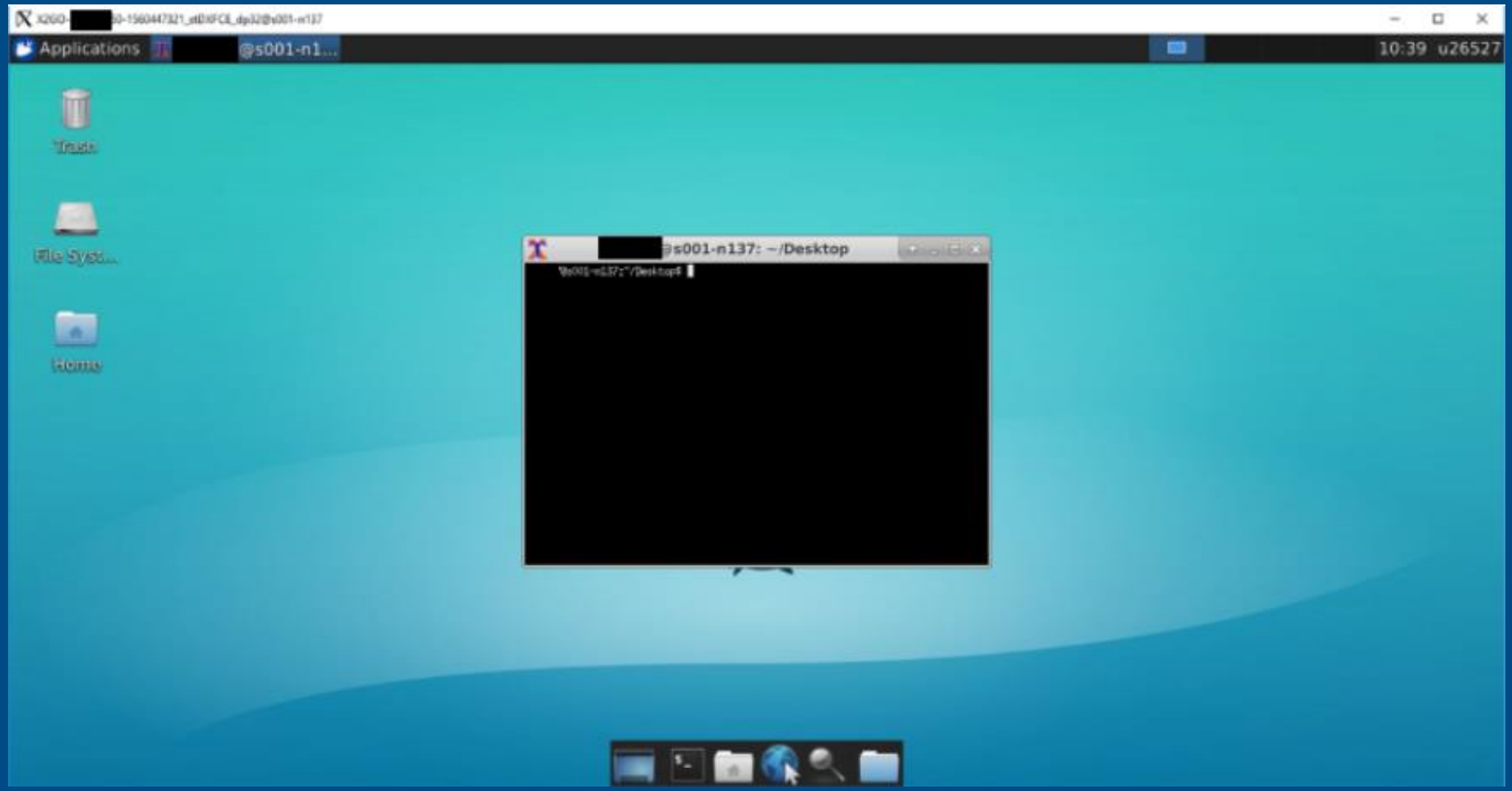


Access method 1: Mobaxterm (multi-tab console)



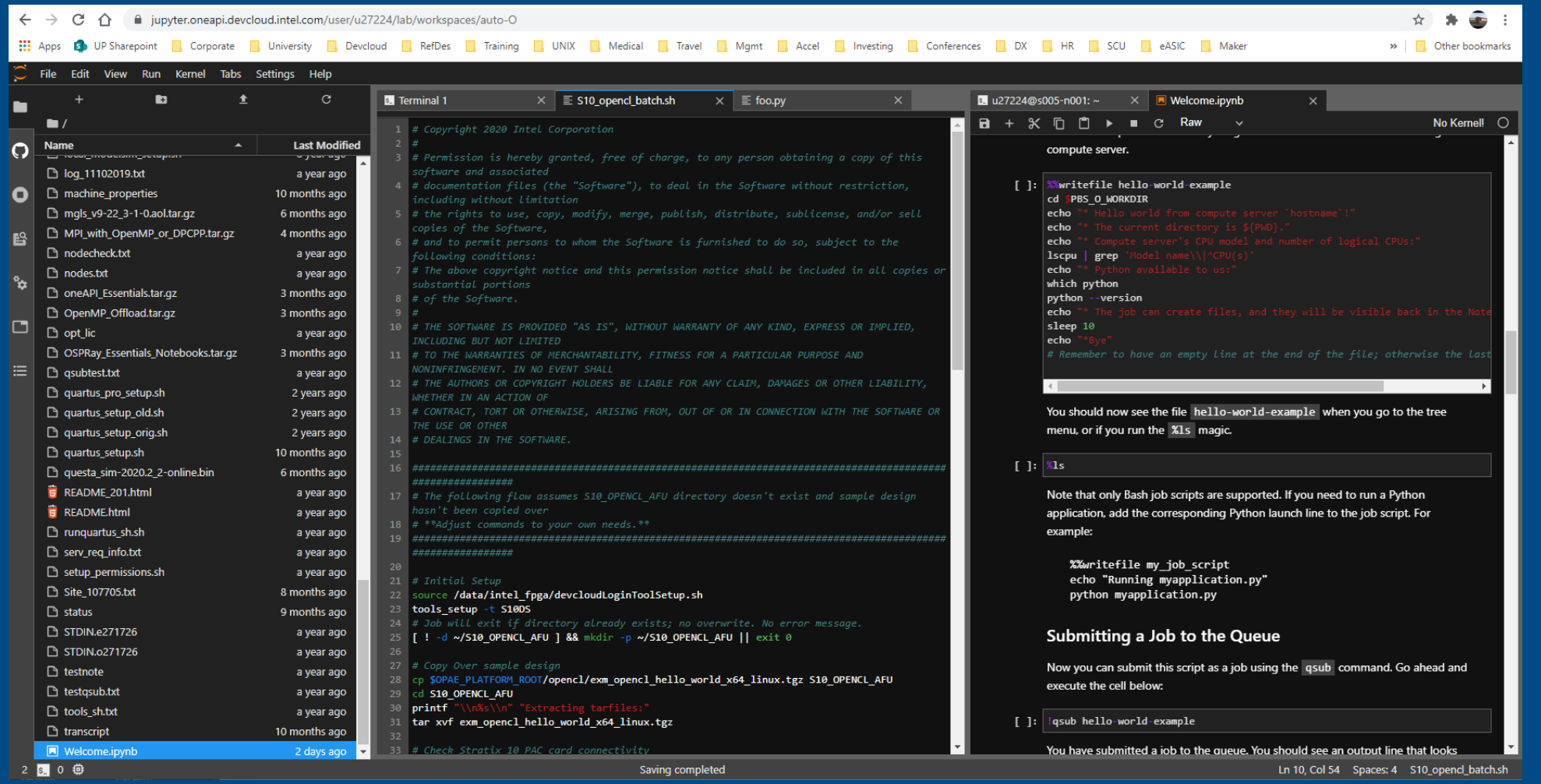
Linux based – makes PC look like Linux filesystem
Doesn't support GUI programs – use X2Go

Access method 2: x2go



Multi window system – using sparingly - for Quartus GUI

Access method 3: JupyterLab



Multi tab system through browser – use native editor, not vi; no Quartus GUI

Contacts for Intel FPGA Devcloud help

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