FC labs intro
EE-435

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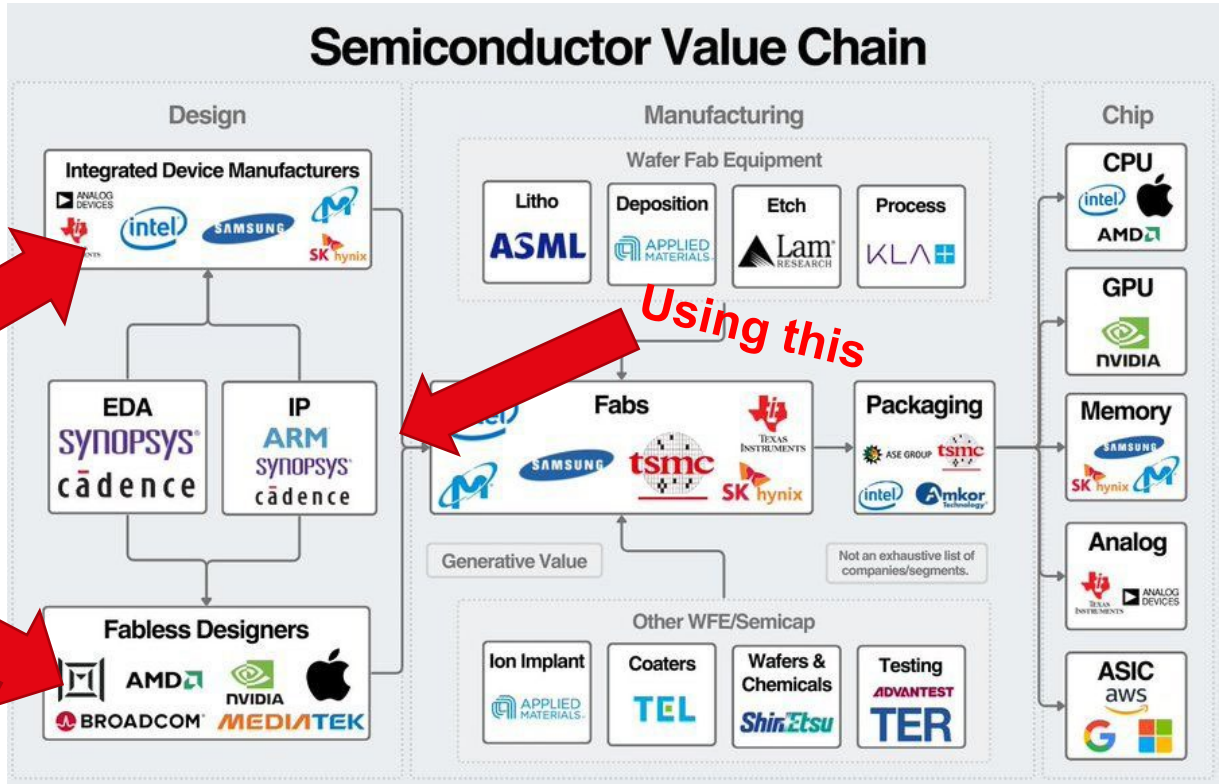
Schedule for the labs

- Today – Schematic edition
- 26-27/09/2025 – Simulation, parametric analysis, variability
- 9-10/10/2025 – layout and verification
- 16-17-31/10 and 07-14/11 – design project with deliverable

Just a few words on EDA



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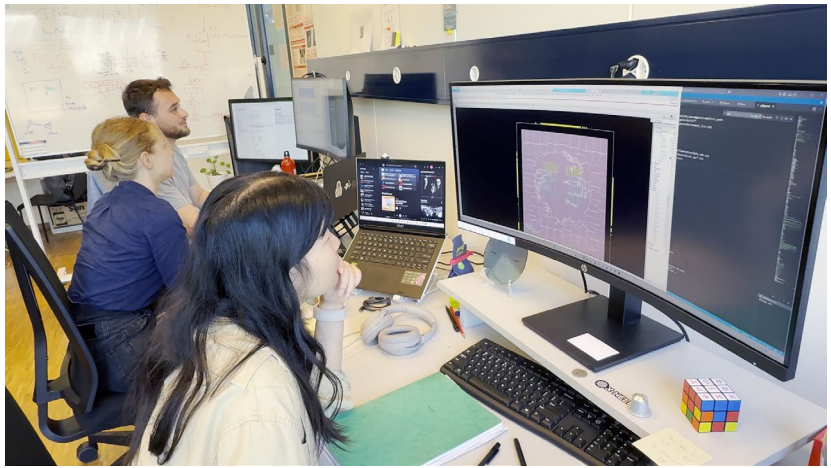
Just a few words on EDA

1950

Herbert Brodmann, CERN
1970



2025, EPFL

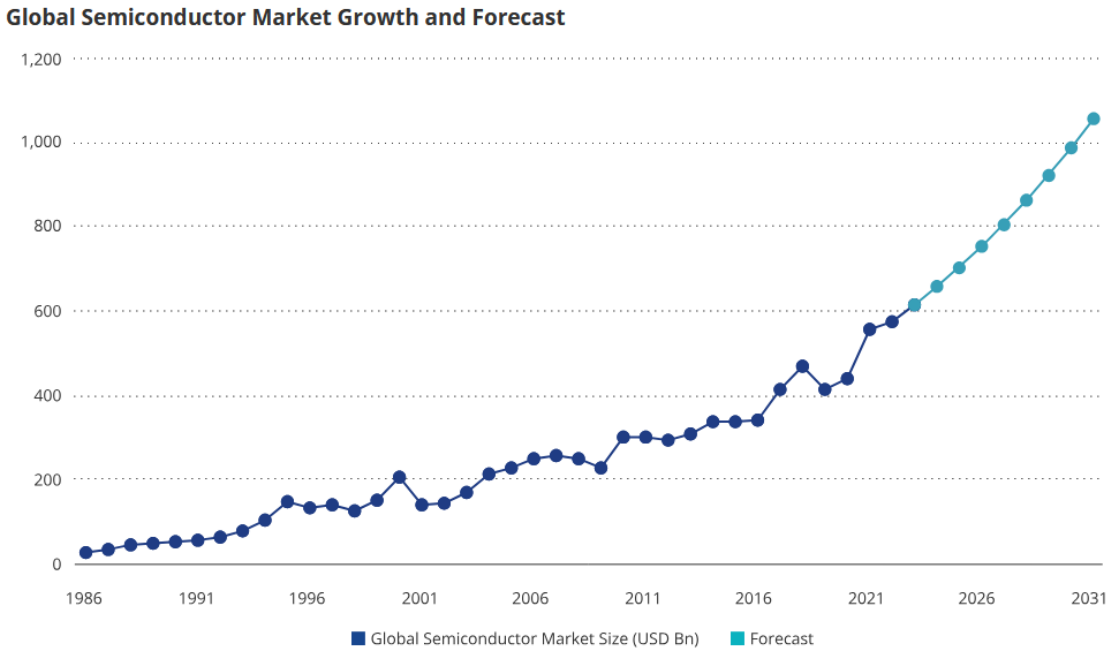
What changes ?
Technology, processes, methodologies, efficiency, scheduling
→ **Mitigate risks**

Electronic Design Automation (EDA)

- Category of (software) tools for designing and producing electronic systems including printed circuit boards (PCBs), integrated circuits (ICs), or systems on chips (SoCs)
  - Alternative terms: Computer-aided engineering (CAE), computer-aided design (CAD)
- EDA market Size and Projections :
  - **$5.7 billion in 2012, $11 billion in 2022**
  - **Projected to $22 Billion in 2030 (9% per year)**
  - https://www.gminsights.com/industry-analysis/electronic-design-automation-eda-market
  - https://www.grandviewresearch.com/industry-analysis/electronic-design-automation-eda-software-market
- A few references
  - https://www.europractice.stfc.ac.uk/
  - https://europractice-ic.com/
  - https://en.wikichip.org/wiki/WikiChip
  - https://www.techinsights.com/
  - https://irds.ieee.org/

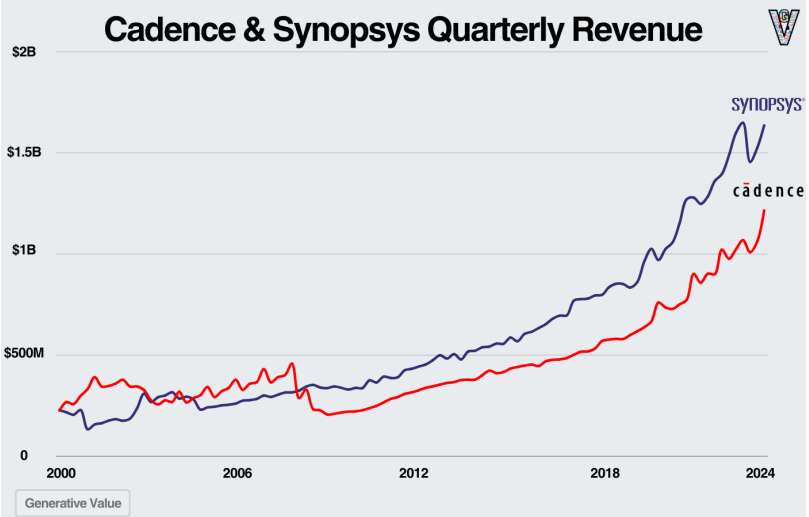
We are where things happen

- Semiconductor market is driven by consumer market, industry, digitalization, AI, ecological transition, energy etc.



Source: World Semiconductor Trade Statistics and Mckinsey's projected yearly growth. *Past performance is no guarantee of future results. Not intended as a recommendation to buy or sell any securities mentioned herein, or as any call to action. For illustrative purposes only. Actual future semiconductor market growth is unknown.*

A few companies concentrating the market



JUL 22, 2025

Design Simulation

Synopsys completes $35B Ansys acquisition

Plus, CoLab releas
startup program,

DESIGNLINES | EMBEDDED DESIGNLINE

Cadence Bolsters Multiphysics Simulation with $3.16bn Acquisition

By Majeed Ahmad 09.05.2025 0

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NEWS

Siemens Acquires Mentor Graphics for $4.5 Billion

Nov. 14, 2016

The German engineering-solutions company announced its biggest deal with an industrial software company since 2007. It expects to increase its footprint in automated technologies by offering software-based designs.

Leah Scully

https://www.engineering.com/synopsys-completes-35b-ansys-acquisition/
https://www.eetimes.com/cadence-bolsters-multiphysics-simulation-with-3-16bn-acquisition/
https://www.machinedesign.com/news/article/21834976/siemens-acquires-mentor-graphics-for-45-billion

Commercial EDA providers – the same companies for 30years

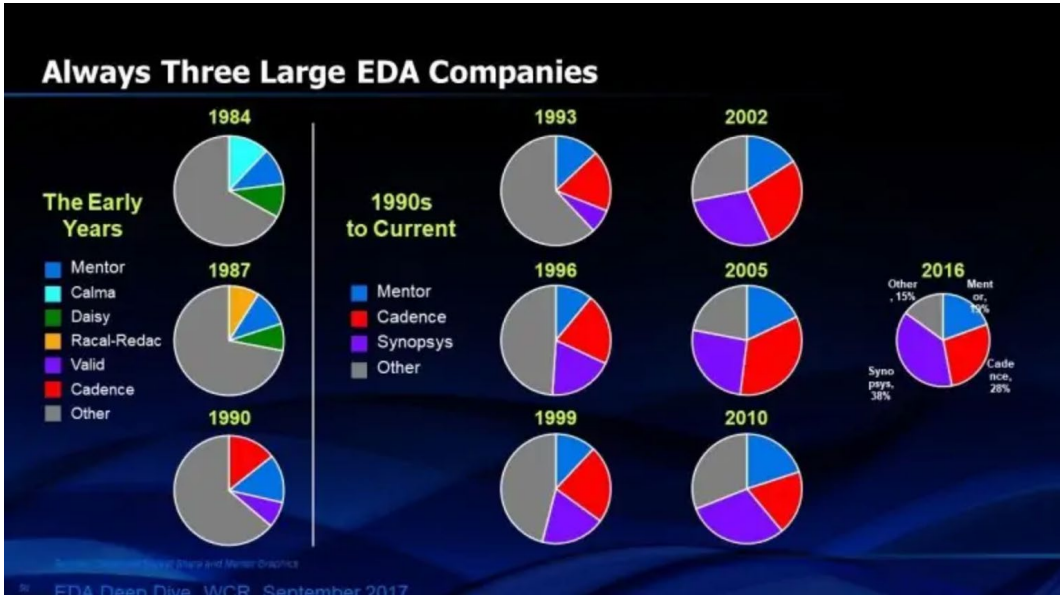
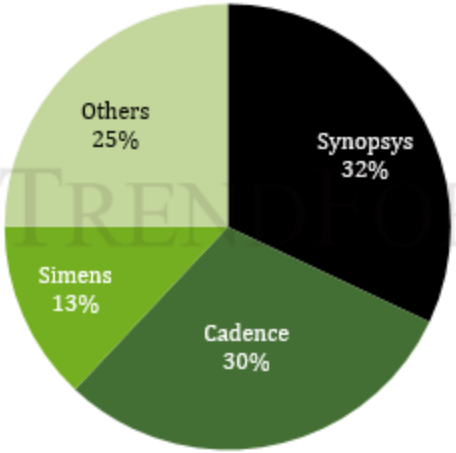


Figure 2: Global EDA Software Market Share, 2021



Source: TrendForce, Aug. 2022

Mentor Graphics cadence SIEMENS SYNOPSYS®

Why it is important to know how to use the tools ?

Open source EDA and open source Hardware

- Commercial EDA tools and technologies are limited by extremely restrictive NDAs and License agreements
- Some initiative exist.
  - Open source PDKs
    - https://github.com/IHP-GmbH/IHP-Open-PDK
    - https://skywater-pdk.readthedocs.io/en/main/
    - https://github.com/google/gf180mcu-pdk
  - Open source EDA tools
    - https://github.com/The-OpenROAD-Project/OpenLane
    - http://opencircuitdesign.com/
- Can be an opportunity for research groups and startups
  - https://www.linkedin.com/pulse/end-to-end-open-source-ic-design-class-eth-z%C3%BCrich-asics-gurkaynak-rj0cf/
  - https://github.com/iic-jku/IIC-OSIC-TOOLS
- Still far from being competitive with commercial tools

EPFL has access to licenses for commercial tools and technologies used in the industry. We train you on these

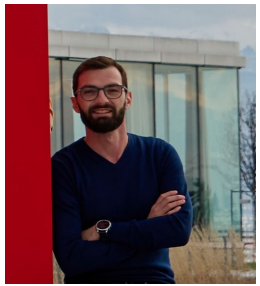
In these labs : What tools for what ?

- Schematic edition, simulation and layout
  - Cadence Virtuoso
  - Alternatives ? Synopsys Custom Compiler
- Spice simulation
  - Cadence Spectre
  - Alternatives ? Synopsys Hspice, SiemensEDA Eldo
- Layout verification/extraction
  - Siemens EDA Calibre
  - Alternatives ? Cadence PVS+Quantus, Synopsys ICV+StaRCX

A team of experts to help you

- Dr. Alexandre Levisse

- Gregoire Eggermann
- Clement Chone
- Alireza Mafi
- Ali Meimandi
- Lara Orlandic
- Ludovic Blanc
- Anna Burdina
- Yuqi Wang
- Pengbo Yu
- Ruben Rodriguez



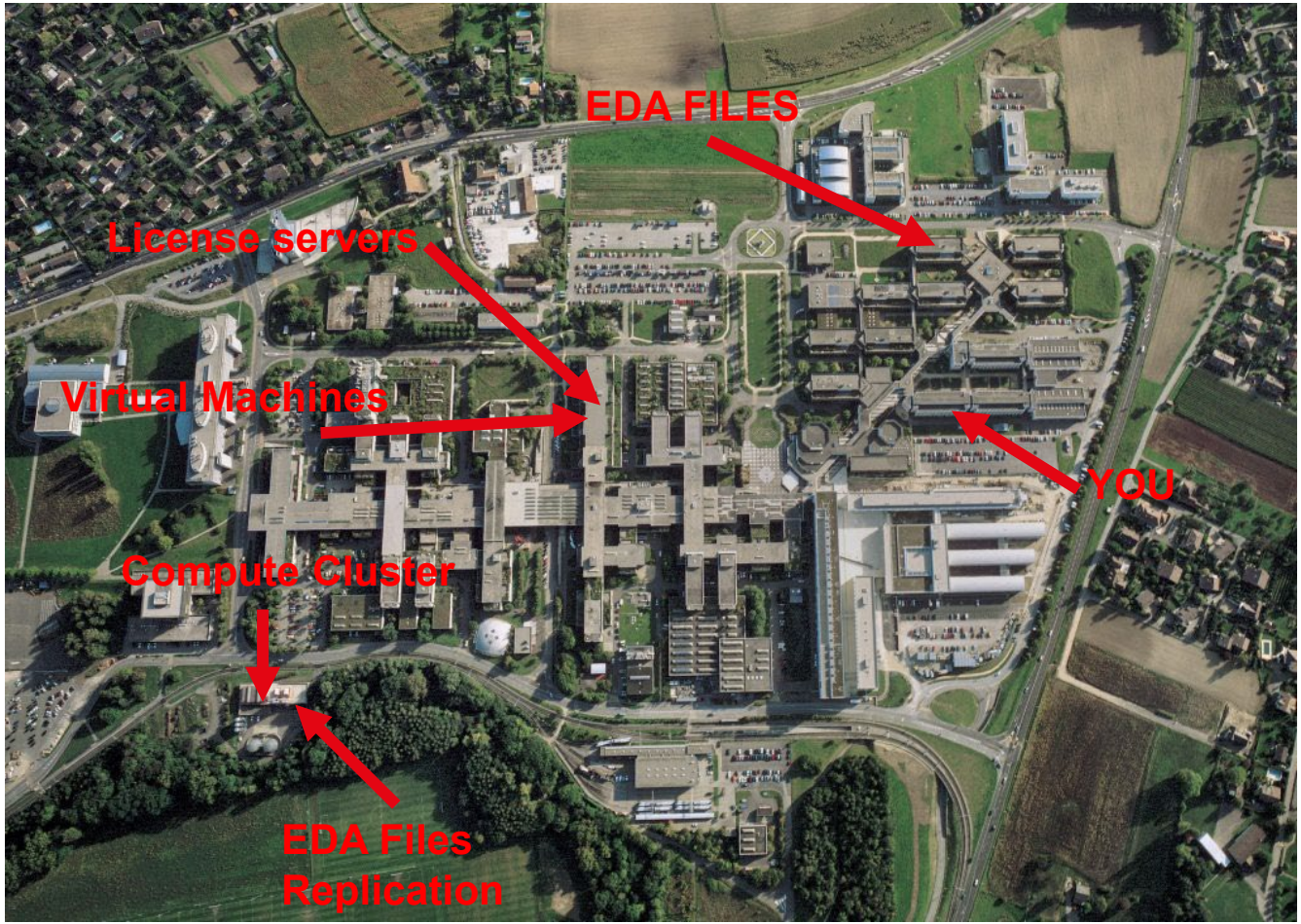








A redundant and distributed infrastructure



In practice

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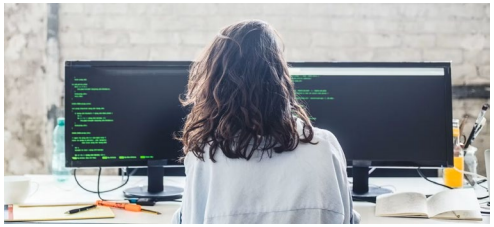
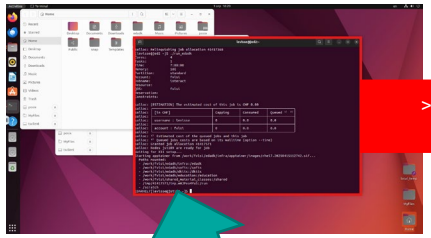


Student computer

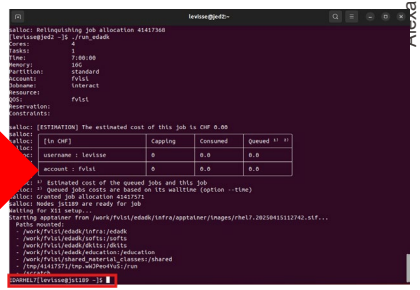
Connecting to a distant desktop through VMWare



Virtual Machine

Connecting to a distant EDA server through SSH

>ssh -X username@server
>./run_edadk



EDA server

This link is stable

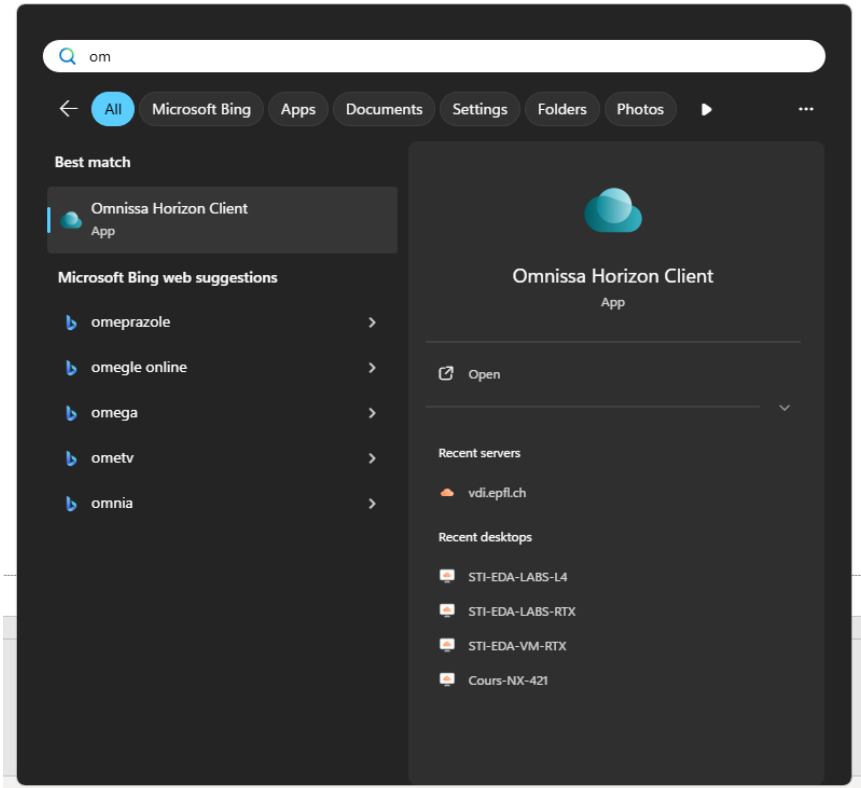
This link will break when you lose wifi or take the subway

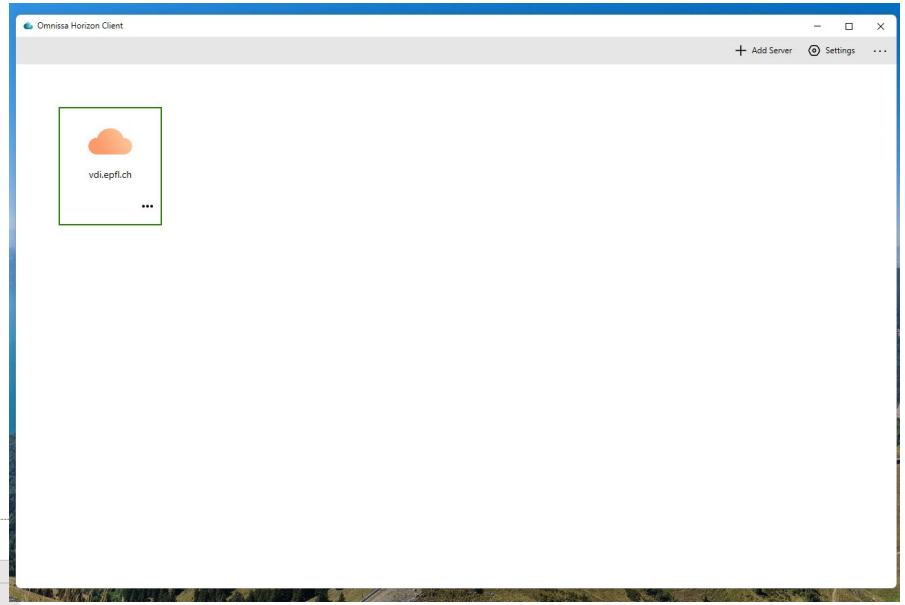
This machine automatically stops itself after 1h30 unused. Releasing licenses

In practice


YOU NEED TO CONNECT TO THE SERVER
BUT I'M ALREADY ON VDI
YOU NEED TO GO DEEPER
imgflip.com

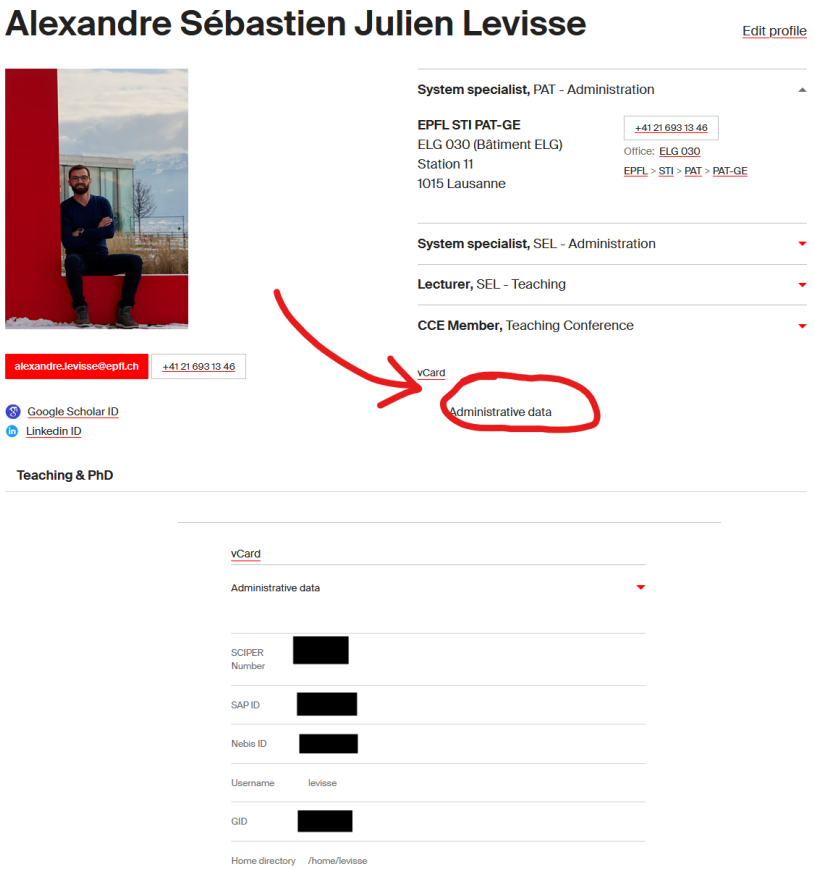
How to start working ?





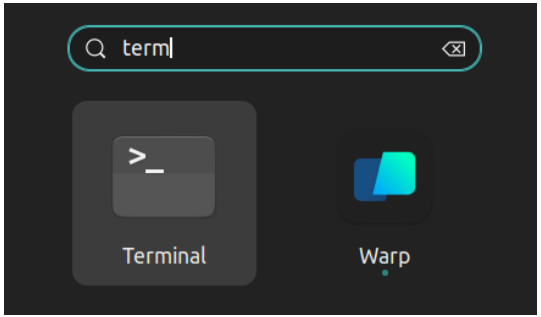
If you don't know your username ?

- https://people.epfl.ch/
- Search for yourself
- Click on "administrative data"
- Connect with your email
- Find your username there !



How to linux ?

- Forget about the graphical file explorer
- Use the terminal



- Learn about it online → links on moodle
- Everything is going to be okay

Last comment

- These labs involve a lot of graphical tools
- You will
  - draw a lot
  - read a lot
  - be precise
  - click a lot

Use the mouse, keyboard and screens provided in this room

Questions ?

Merci

Alexandre Levisse

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