



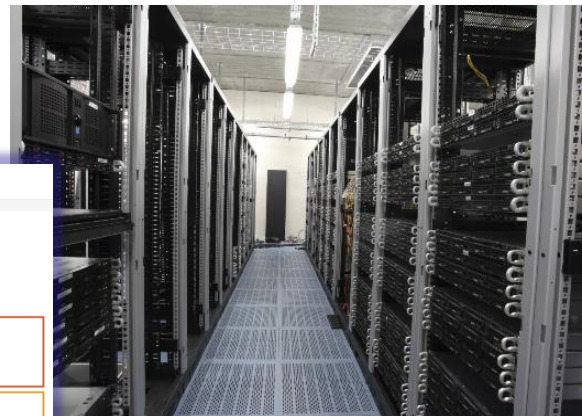
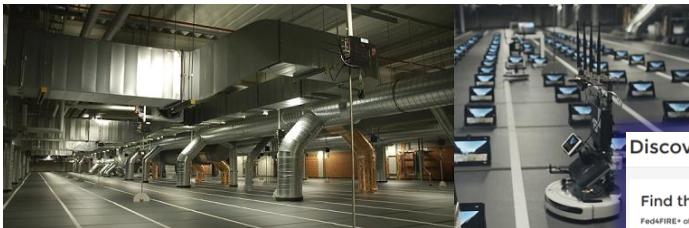
imec

ILAB.T INFRASTRUCTURE

BRECHT VERMEULEN

TESTBEDS: REAL HARDWARE FOR EXPERIMENTATION AND EDUCATION

<http://doc.ilabt.imec.be>










Discover our testbeds

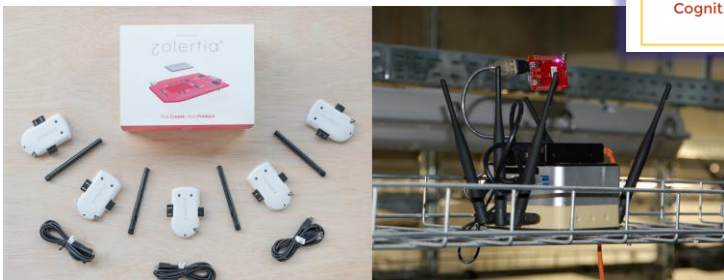
Find the testbed that is right for you

Fed4FIRE* offers a wide range of testbeds in a wide range of technology domains.

To help you find a testbed that matches your needs, we provide an easy-to-use directory in which you can filter on available technologies, testbed properties, location and more.

Select the domain in which you are interested to continue:

 Wired	 Wireless	 5G
 IoT	 Big Data	 OpenFlow
 Cloud	SDN	AI
Cognitive Radio	HPC	GPU



Device, data & experiment management

DEVICE MANAGEMENT



TESTBED MANAGEMENT



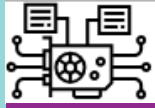
SERVICE MANAGEMENT



Scalable AI, Cloud and big data services (data processing)



VIRTUAL WALL



GPULAB

CLOUD AND CONTAINER-ON-DEMAND



OBELISK

Federated Large-scale validation testbeds (communication, sensing, actuation)



W-ILAB.T



VIRTUAL WALL



PORTABLE TESTBED



OFFICELAB



INDUSTRIAL IoT LAB



CITYLAB



SMART HIGHWAY



HOMELAB



INTERACTION LAB



DE KROOK

TECHNOLOGY-DRIVEN

APPLICATION-DRIVEN

Rapid hardware prototyping



OCTA

Universiteit Antwerpen



REAL-TIME SDR

VIRTUAL WALL

VIRTUAL WALL TESTBED

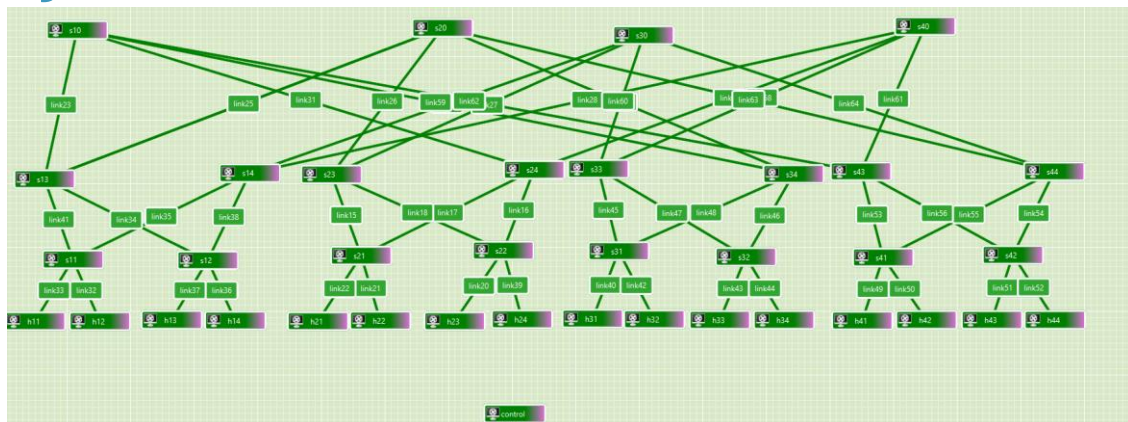
550+ bare metal servers

full root access
bulk deployment

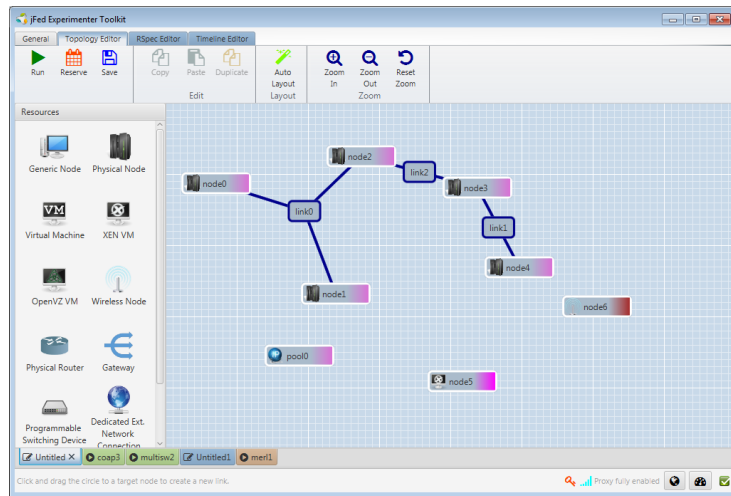
cloud,
service backend,
networking,
computation,
performance



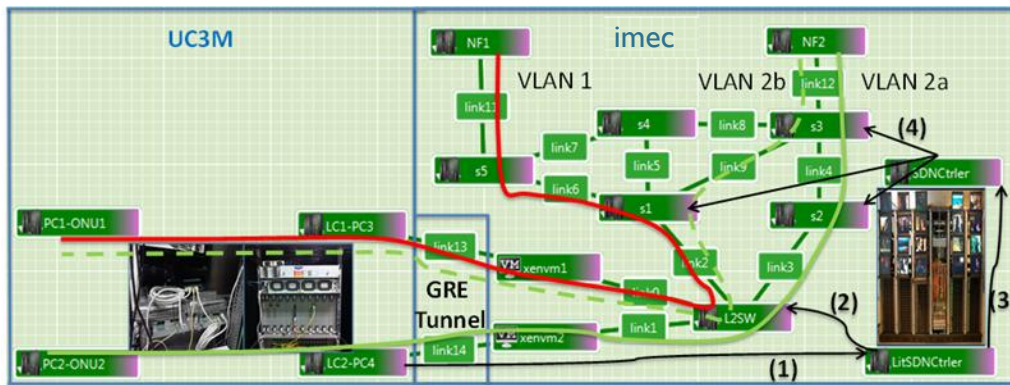
JFED TOOL: EASY ACCESS



Advanced SDN experiment



jFed



Combine multiple testbeds

GPULAB

GPULAB: FLEXIBLE GPU INFRASTRUCTURE

- GPU Lab job system: docker job scheduling system
 - Multi-gpu jobs supported!
- Jupyter notebooks with GPUs: interactive

jupyter Home Token Admin Documentation bvermeu2 Logout

Spawner Options

General settings

Select a project:
bvermeu9

Docker settings

Docker Image:
gpublab.iaabt.imec.be:5000/jupyter/tensorflow-notebook:latest

Command:
start-notebook.sh

Requested resources

CPUs:
1

GPUs:
1

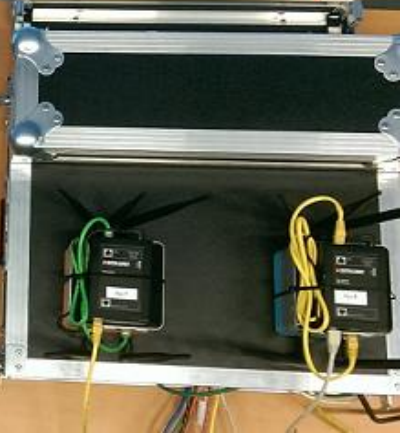
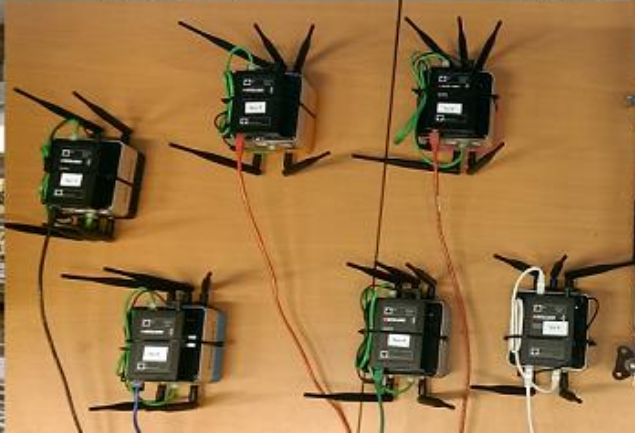
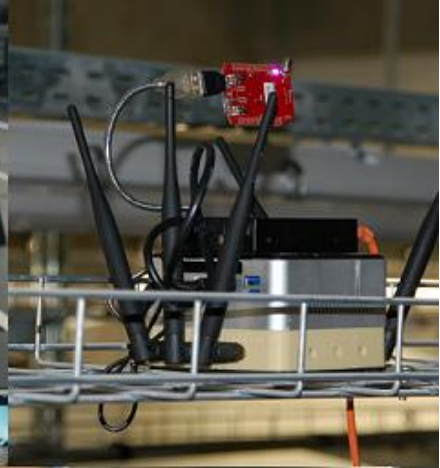
#MB Memory:
2048

Job will run on cluster
Currently available: 16 CPU's, 72 GPU's, 466 GB of memory. (details)

GPULAB INFRASTRUCTURE

- 125 GPU cards spread over +/- 50 machines
- 1,2 or 11 cards per machine (in-house builds)
- 1080TI, RTX2080TI, V100
- Specs:
 - 570.000 cuda cores, 1.8TB GPU RAM
 - 1.7 PFLOP Single precision
 - 2.2 PFLOP Single Precision + tensor performance
- 2x HGX-2 and 100TB fast NVMe storage
 - 16x V100, 92000 cuda cores, 250TFLOP single precision, 2PFLOP tensor performance, 512GB GPU RAM, 1.5TB CPU RAM

WIRELESS & IOT TESTBEDS
W-ILAB.T – OFFICELAB – PORTABLE TESTBED

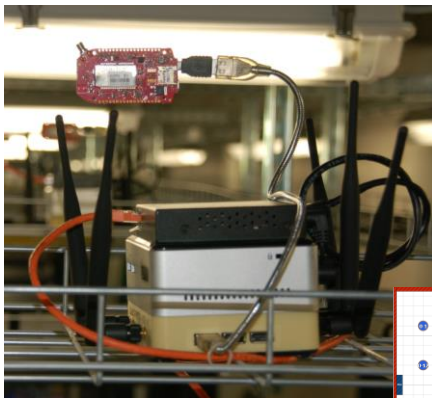


W-ILAB.T TESTBED

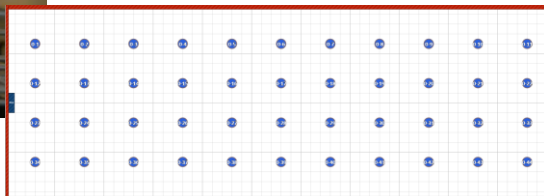
2 testbed locations:

- w-iLab.1: datacenter with 44 embedded PCs (WiFi and sensor nodes)
- w-iLab.2: industrial room with 100 fixed + 15 mobile nodes (WiFi, sensor, LTE, SDR)

Use cases: wireless, sensor, mobile, networking, SDR, 3rd party hardware



4 RF-shielded boxes



<https://wilab1.ilabt.iminds.be/inventory>

<https://inventory.wilab2.ilabt.iminds.be>

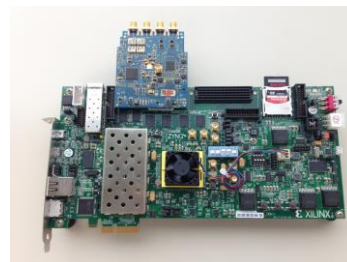
W-ILAB.T – SOFTWARE DEFINED RADIO



USRP x310 (x2)
10Gbps fiber to switch
10 Gbps Ethernet to server



USRP B210 (x4)
USRP B200 (x4)
USB3.0 to Intel NUC



ZC706 with
Zync-7000 SoC (x3)
1 Gbps Ethernet to APU
2 x USB (UART + JTAG)
APU
AMD G-series (1 GHz)
Only for programming & debugging

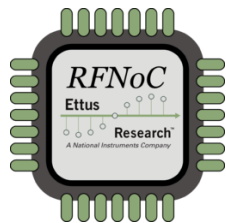


Xilinx ZedBoard
Zync-7000 SoC (x1)
2 x USB (UART + JTAG)

SERVER (x7)
Intel Xeon Processor D-1541
(2.1GHz, 8 cores, 16 threads)
16GB DDR4 RAM

NUC (x8)
Intel Core i5-4250U
(3M Cache, up to 2.60 GHz)
8GB DDR3 RAM

SERVER
Intel Xeon
Only for programming & debugging

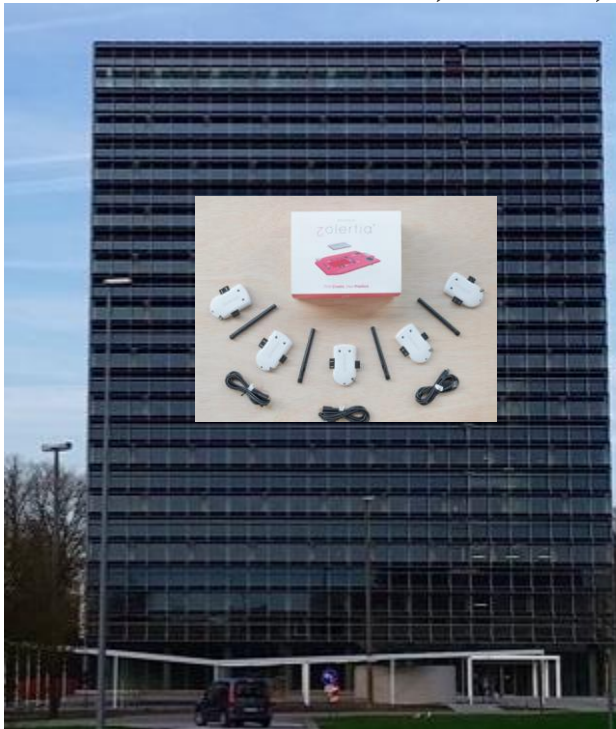


open-source 4G from
handset to core

IOT-OFFICELAB

Office environment with 110 embedded PCs spread over 3 office floors

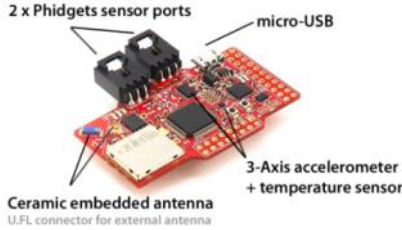
Use cases: wireless, sensor, networking, 3rd party hardware, indoor localization (UWB)



CONSTRAINED IOT DEVICES



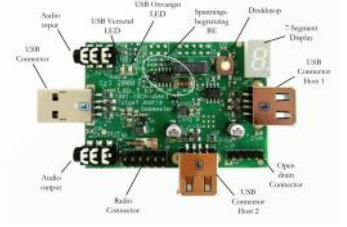
- Zolertia Re-Mote
 - 2.4GHz / 868MHz
 - UWB-shield (in-house developed)
- Currently deployed:
 - Temperature sensors
 - Many other sensors possible



- Zolertia Z1
 - 2.4GHz



- RM090
 - 2.4GHz



- Environment Emulator
 - Battery emulation
 - 6KHz sample rate
 - Generate I/O events on DUT
 - RM090/Re-Mote



- Nordic Semiconductor nRF52 DK
 - BLE development kit



- Sparklan WPEA-251N(BT)
 - 802.11a/b/g/n
 - Bluetooth 4.0 LE/ 3.0 HS/ 2.1 EDR standard



imec

[HTTPS://DOC.ILABT.IMEC.BE](https://doc.ilabt.imec.be)

[HTTPS://PORTAL.SLICES-SC.EU](https://portal.slices-sc.eu)

[HTTPS://DOC.SLICES-SC.EU](https://doc.slices-sc.eu)