



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



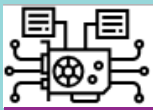
SERVICE MANAGEMENT



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



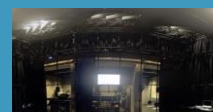
CITYLAB



SMART HIGHWAY



HOMELAB



INTERACTION
LAB



DE KROOK

TECHNOLOGY-DRIVEN

APPLICATION-DRIVEN

Rapid
hardware
prototyping

IDLab
INTEGRITY & DATA LAB

UNIVERSITEIT
GENT
Universiteit
Antwerpen



OCTA



REAL-TIME SDR

VIRTUAL WALL

VIRTUAL WALL TESTBED

550+ bare metal
servers

full root access
bulk deployment

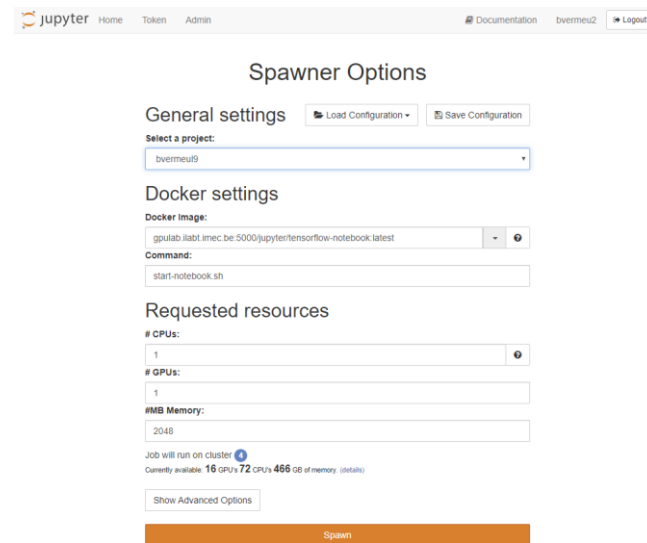
cloud,
service backend,
networking,
computation,
performance



GPULAB

GPULAB: FLEXIBLE GPU INFRASTRUCTURE

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



The screenshot shows the JupyterLab web interface. At the top, there is a navigation bar with the JupyterLab logo, links for Home, Token, and Admin, and user information (Documentation, bvermeu2, Logout). The main content area is titled 'Spawner Options'. It contains three sections: 'General settings' with a 'Select a project:' dropdown menu set to 'bvermeu2' and buttons for 'Load Configuration' and 'Save Configuration'; 'Docker settings' with a 'Docker image:' dropdown set to 'gpulab.iabt.imec.be:5000/jupyter/tensorflow-notebook:latest' and a 'Command:' text box containing 'start-notebook.sh'; and 'Requested resources' with input fields for '# CPUs:' (set to 1), '# GPUs:' (set to 1), and '#MB Memory:' (set to 2048). Below these fields, a status message indicates 'Job will run on cluster' and 'Currently available: 16 CPUs, 72 GPUs, 466 GB of memory'. A 'Show Advanced Options' button is at the bottom left of the form, and a large orange 'Spawn' button is at the bottom right.

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 prevision, 2PFLOP tensor performance, 512GB GPU RAM, 1.5TB CPU RAM

WIRELESS & IOT TESTBEDS

W-ILAB.T – OFFICELAB – PORTABLE TESTBED

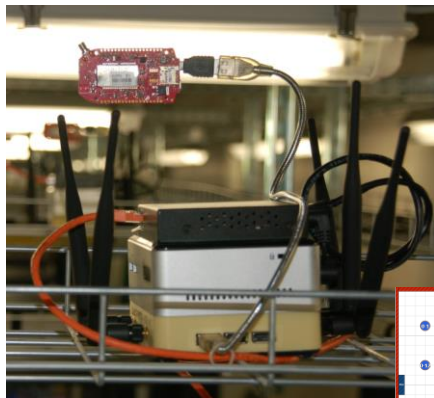


W-ILAB.T TESTBED

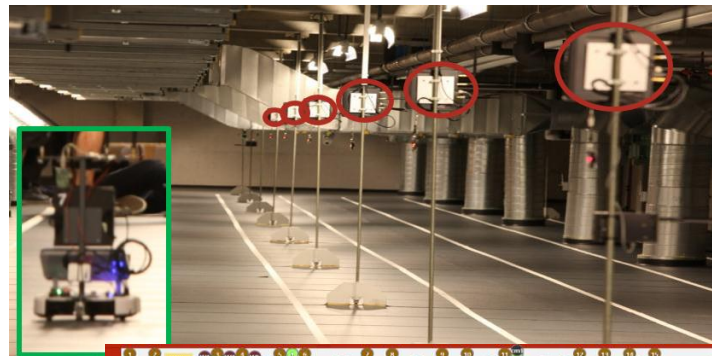
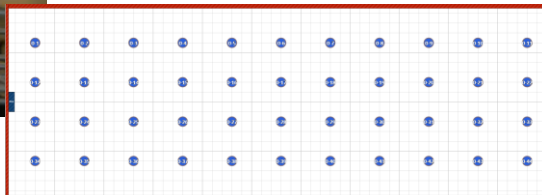
2 testbed locations:

- 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>

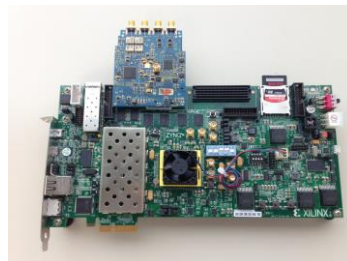
W-ILAB.T – SOFTWARE DEFINED RADIO



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



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



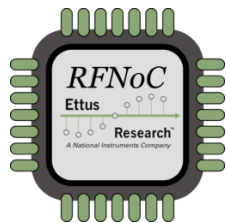
ZC706 with
Zync-7000 SoC (x3)
1 Gbps Ethernet to APU
2 x USB (UART + JTAG)
APU
AMD G-series (1 GHz)
Only for programming & debugging



Xilinx ZedBoard
Zync-7000 SoC (x1)
2 x USB (UART + JTAG)
SERVER
Intel Xeon
Only for programming & debugging

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

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



Openwifi

First FREE open source
full stack real-time Wi-Fi

imec iLab.t documentation

TABLE OF CONTENTS

Virtual Wall

Wireless Testlab and OfficeLab

Overview

Getting started

Tutorials and howto's

IOT-OFFICELAB

Office environment with 110 embedded PCs spread over 3 office floors

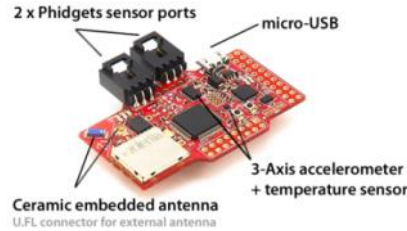
Use cases: wireless, sensor, networking, 3rd party hardware, indoor localization (UWB)



CONSTRAINED IOT DEVICES



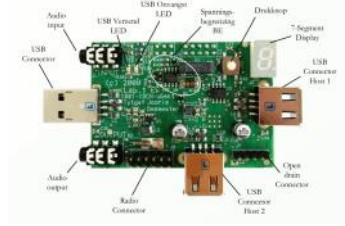
- Zolertia Re-Mote
 - 2.4GHz / 868MHz
 - UWB-shield (in-house developed)
- Currently deployed:
 - Temperature sensors
 - Many other sensors possible



- 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



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