EduNet

International Education Network – a PHOENIX CONTACT Initiative

KÄRNTEN
University of Applied Sciences

ETAT

Education & Training for Automation 4.0 in Thailand /ETAT

Support in Education & Training for Automation 4.0 in Thailand Universities by EduNet members

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ETAT Objectives

- The general aim of ETAT is to enhance the employability of university graduates and Life-Long Learning (LLL) in the field of Industry 4.0 and industrial automation by the introduction of European standards of education through practical examples.

- The ERASMUS + project ETAT aims to create training and education centres in the field of engineering at selected universities in the Thai economic region of East Economic Corridor (EEC)

- The project will establish six training and education centres at six Thai partner universities in the local area of Bangkok, which will be equipped with 24 training places.

ETAT Project Partners

- European Partners (in the order of project participation):

  - Carinthia University of Applied Sciences – Austria

    - Project Management

  - Univeristy of Antwerp – Belgium

    - Quality Management

  - Universidad de Oviedo, Spain

    - Didactical structure and content of the ESL

  - Free University of Bozen-Bolzano, Italy

    - ETAT Smart Lab (ESL) Hardware

  - Oniversidad de Porto, Portugal

  - EduNet World Association e.V.

    - Dissemination

  - Slovak University of Technology in Bratislava, Slovakia

    - E-Learning & Collaboration platform
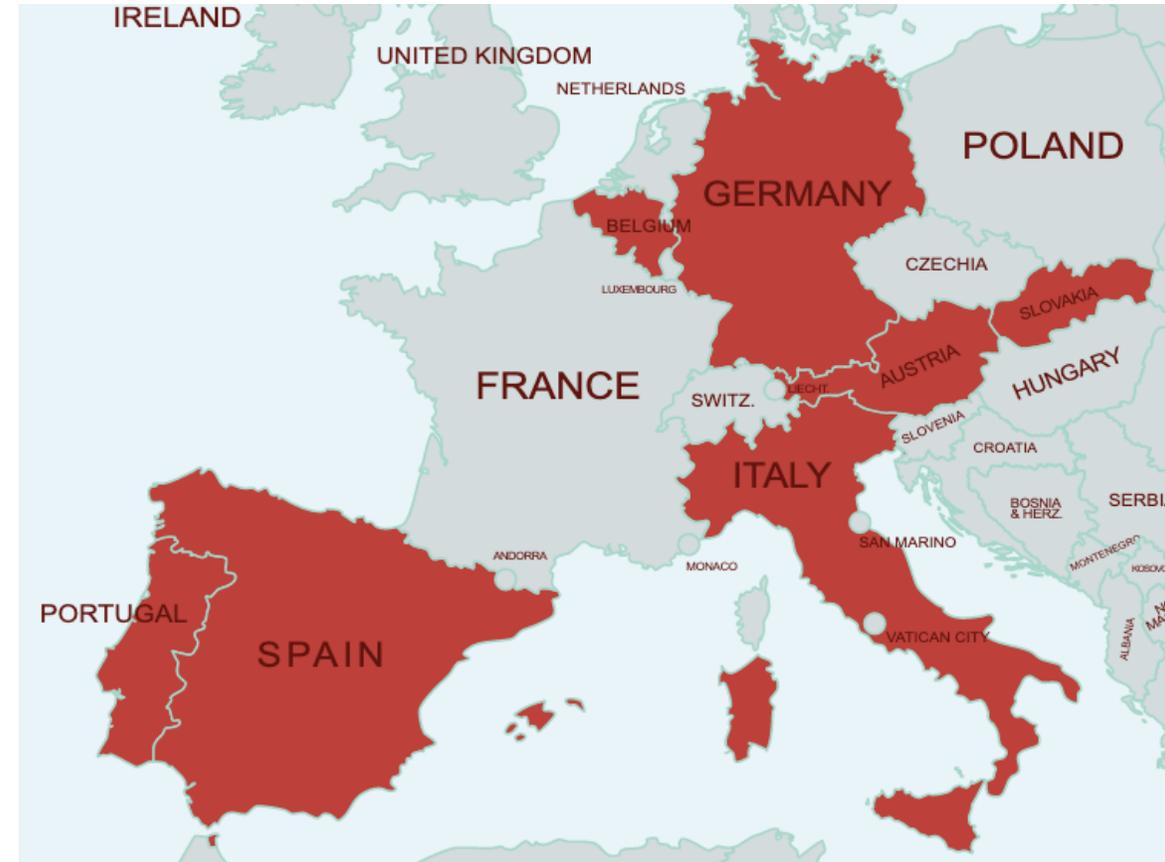
ETAT Project Partners

- Thai Partners (in the order of project participation):
  - Burapah University, Thailand
    - ETAT Training Centers
  - Rajamangala University of Technology Tawan-ok, Thailand
    - Development of the structure, methodology and scheme of the EU trainings
  - Rajabhat Rajanagarindra University, Thailand
  - King Mongkut´s University of Technology North Bangkok, Thailand
    - Testing and evaluation ETAT Smart Labs
  - Kasetsart University, Bangkok, Thailand
  - King Mongkut's Institute of Technology Ladkrabang, Thailand
    - Translation
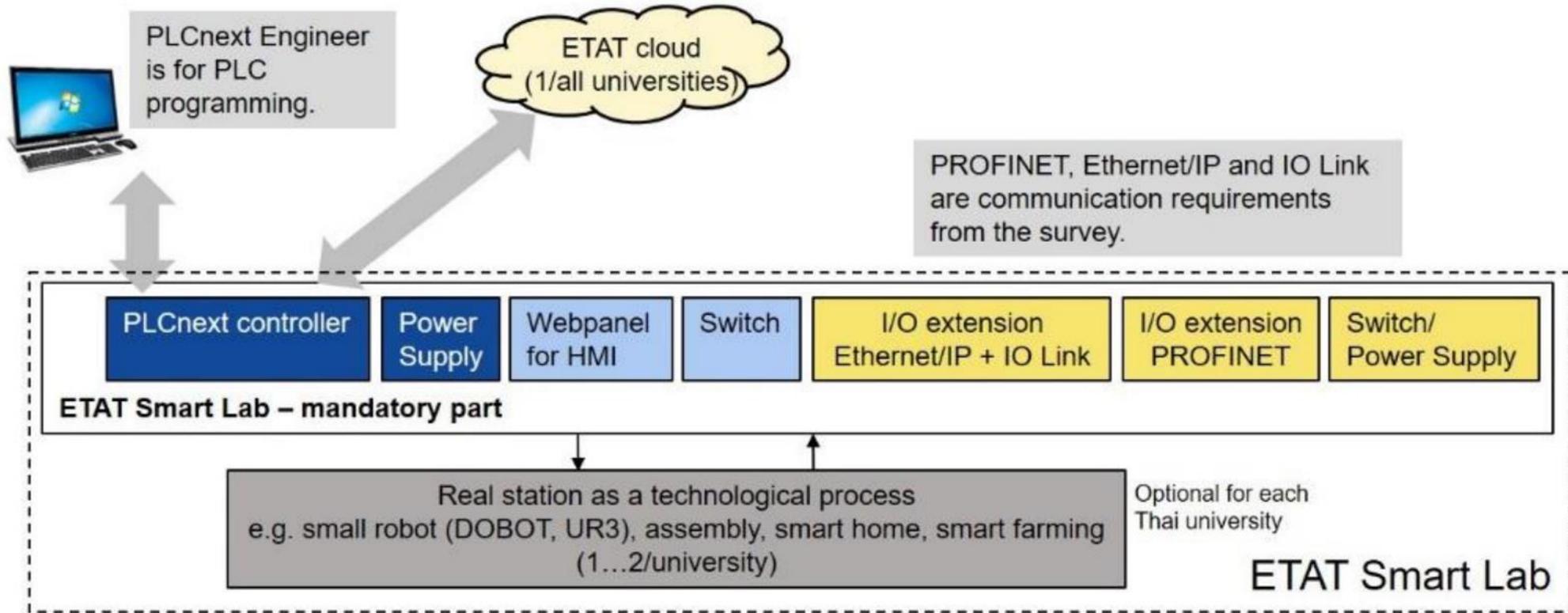 - Eastern Economic Corridor Office, Bangkok, Thailand
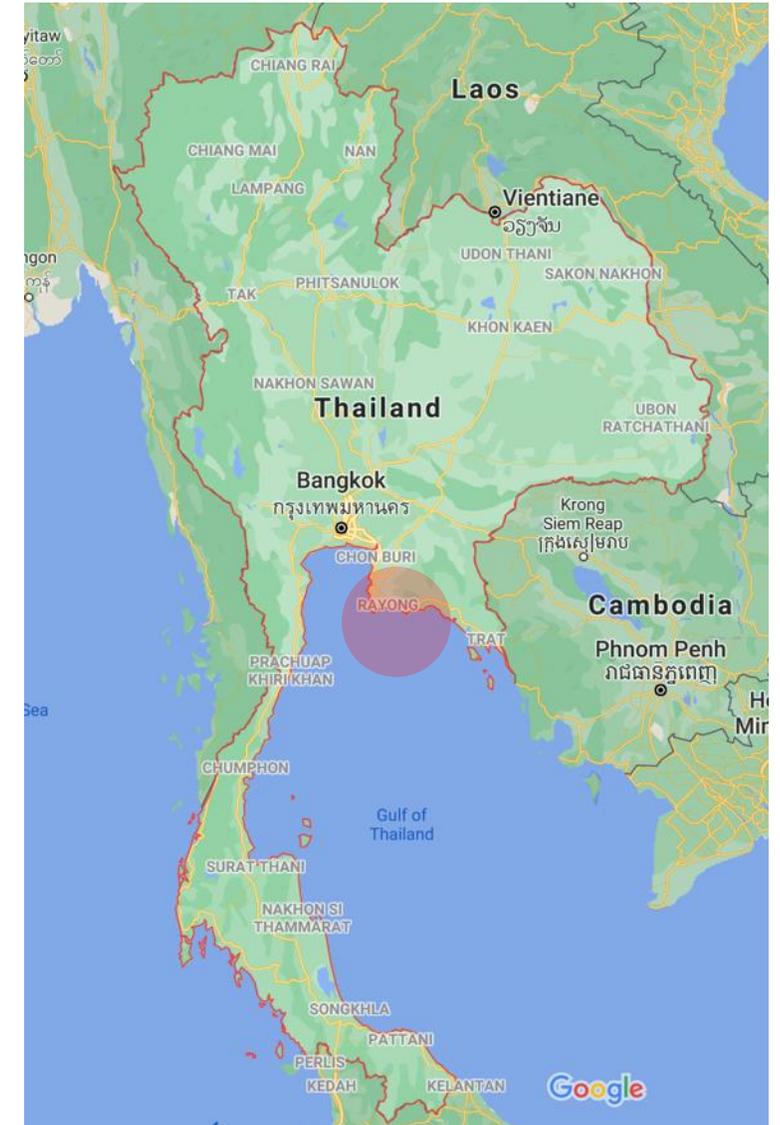
ETAT Smart Labs – General Requirements

- The core of an ESL is a programmable logic controller (PLC) that meets the requirements of an Industry 4.0 controller and enables the creation of control programs using various programming languages:
  - IEC 61131-3, C/C++, C#, Java
- The PLC must be able to communicate with a cloud via MQTT and should be embedded in an ecosystem with an app store, developer blogs, knowledge hub, etc.
- It should contain at least one device unit for operation and visualization (HMI panel).
- Various peripheral units must be integrated, which allow the connection of technological models via digital and analog signals.
- The communication technologies between ESL components should at least be:
  - Ethernet, PROFINET, Modbus TCP, Ethernet/IP and IO-Link.
- The ESL should have a modular structure and consist learning boards.

ETAT Smart Labs – Structure

PLCnext Engineer is for PLC programming.

ETAT cloud (1/all universities)

PROFINET, Ethernet/IP and IO Link are communication requirements from the survey.

ETAT Smart Lab – mandatory part

| PLCnext controller | Power Supply | Webpanel for HMI | Switch | I/O extension Ethernet/IP + IO Link | I/O extension PROFINET | Switch/ Power Supply |

Real station as a technological process e.g. small robot (DOBOT, UR3), assembly, smart home, smart farming (1…2/university)

Optional for each Thai university

ETAT Smart Lab

Mandatory parts for each ESL (unification):
- Part I: Control technology
- Part II: Visualization & Operating
- Part III: Peripheral & Cloud components

Optional part for each Thai university:
- Part IV: One or more technological models or real stations

ETAT Smart Labs – Communication
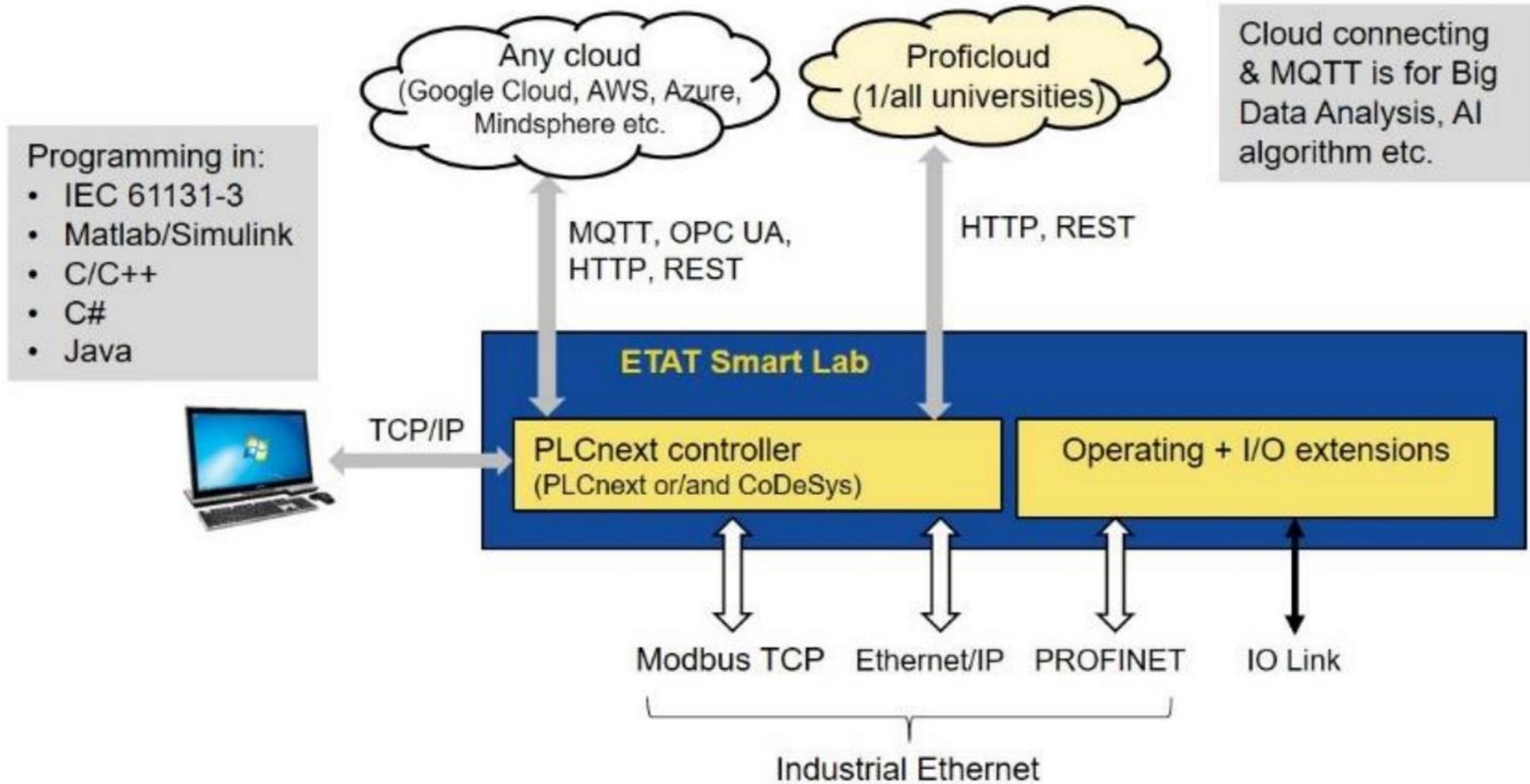
ETAT Smart Labs – Components

Name of the module	Description	Comments
EDU AXC F 2152	Eduline Training Board with PLCnext Controller	PLCnext starter kit with 8 digital and 2 analogue I/O on-board each. The I/O signals can be accessed flexibly via a terminal block.
PLCnext Engineer	License for the programming environment	Software
MQTT connector	App for the PLCnext controller	Software
PROFICLOUD	Access license for the PROFICLOUD	One account for 3 years (1/University)

Co-funded by the
Erasmus+ Programme
of the European Union
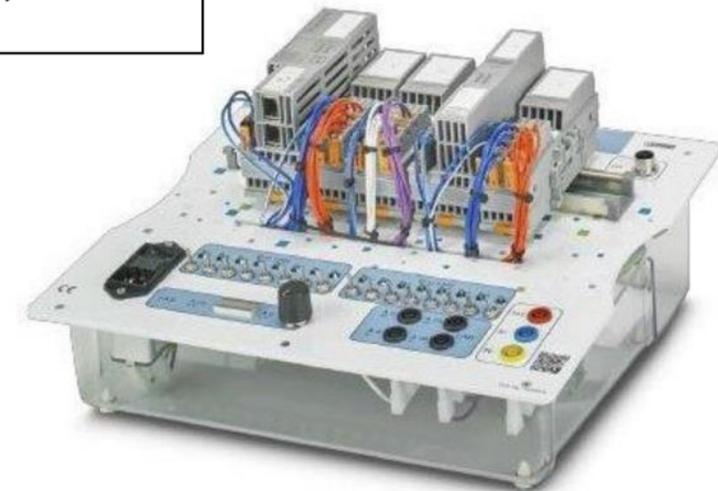
ETAT

ETAT Smart Labs – Components

Name of the module	Description	Comments
EDU HMI WP 07T	Web Panel Trainer as HMI or visualization and operating	Connection by Ethernet
EDU PS 24VDC 4,2 A	Power Supply for Eduline modules	
EDU FL SWITCH SFN 5TX	Ethernet Switch	5 TP-RJ45-Ports (10/100 MHz)

ETAT Smart Labs – Components

| Name of the module	Description	Comments
I/O server board PROFINET/IO Link	PROFINET I/O extension with • PROFINET bus coupler • I/O module with 16 digital I/Os each, • I/O module with 4 analog I/Os each • IO Link module with 8 IO Link ports	Built as an Eduline Training Board. The I/O signals can be flexibly accessed via a terminal block.
I/O server board Ethernet/IP/IO Link	Ethernet/IP I/O extension with • Ethernet/IP bus coupler • I/O module with 16 digital I/Os each,	Built as an Eduline Training Board. The I/O signals can be flexibly accessed via a terminal block.
	• I/O module with 4 analog I/Os each • IO Link module with 8 IO Link ports	
EDU PS 24VDC 4,2 A	Power supply for Eduline modules	
EDU FL SWITCH SFN 5TX	Ethernet Switch	5 TP-RJ45-Ports (10/100 MHz)
IOL-CONF	Software for parametrization of IO Link devices	Software

ETAT Smart Labs – Components

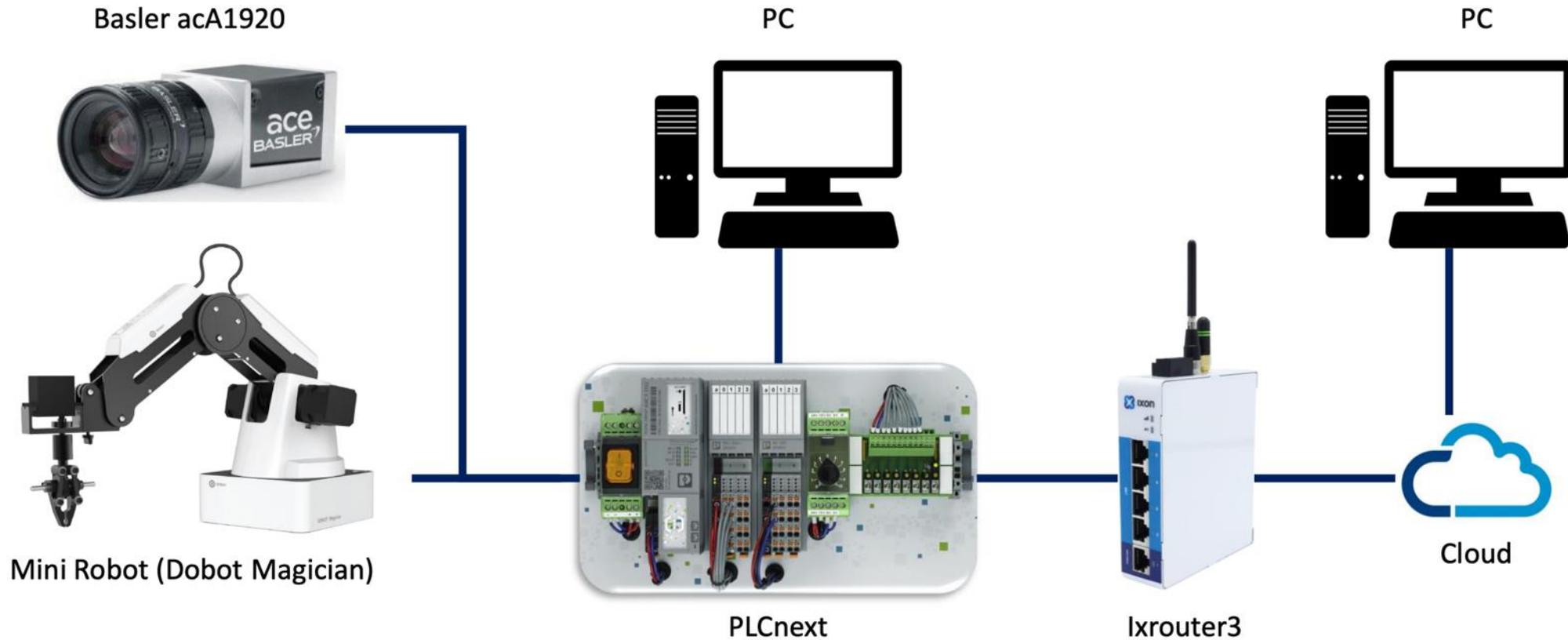| Name of the module	Description	Comments
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ESL – Technological Models
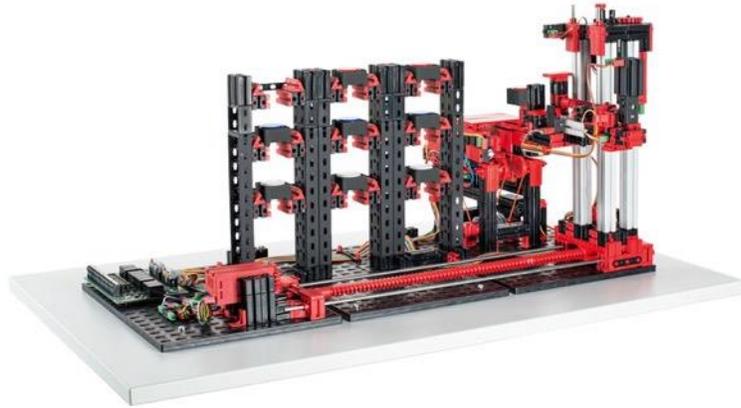
Automated High-Bay Warehouse

Factory Simulation
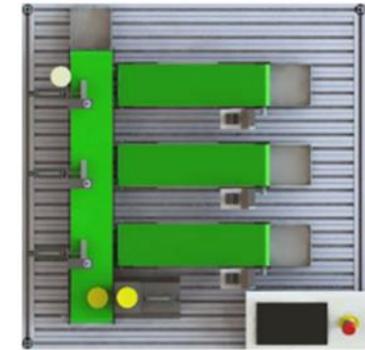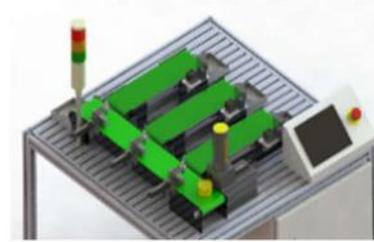
Automated Sorting Conveyor Simulation System

ESL – Technological Models
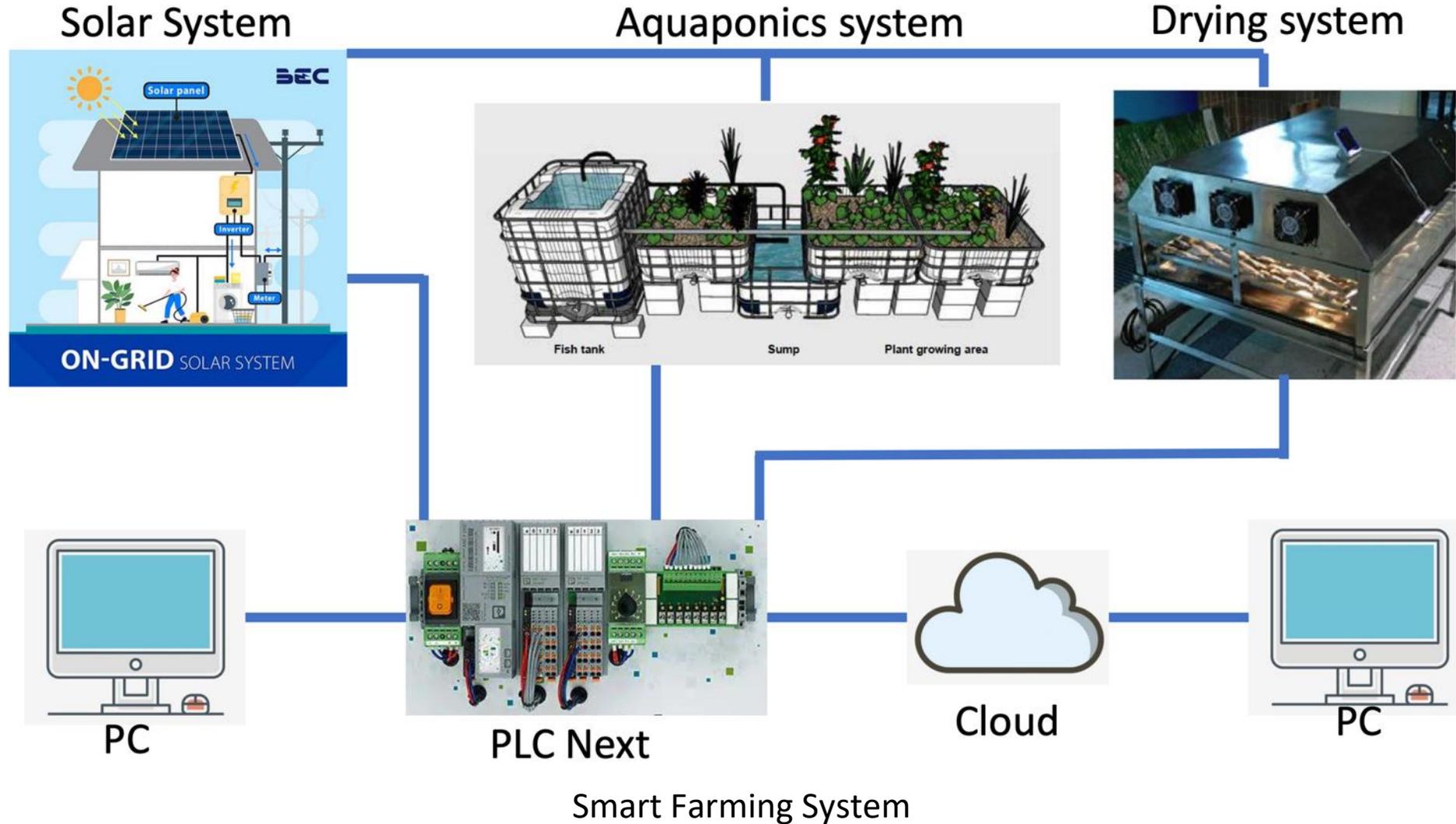

Basler acA1920

Mini Robot (Dobot Magician)

PC

PLCnext

Ixrouter3

PC

Cloud

Automated Quality Inspection and Robot Control

ESL – Technological Models

ETAT

Solar System

Aquaponics system

Drying system

Solar panel

BEC

Inverter

Meter

ON-GRID SOLAR SYSTEM

Fish tank   Sump   Plant growing area

PC

PLC Next

Cloud

PC

Smart Farming System

ESL – Technological Models

Flood Warning System
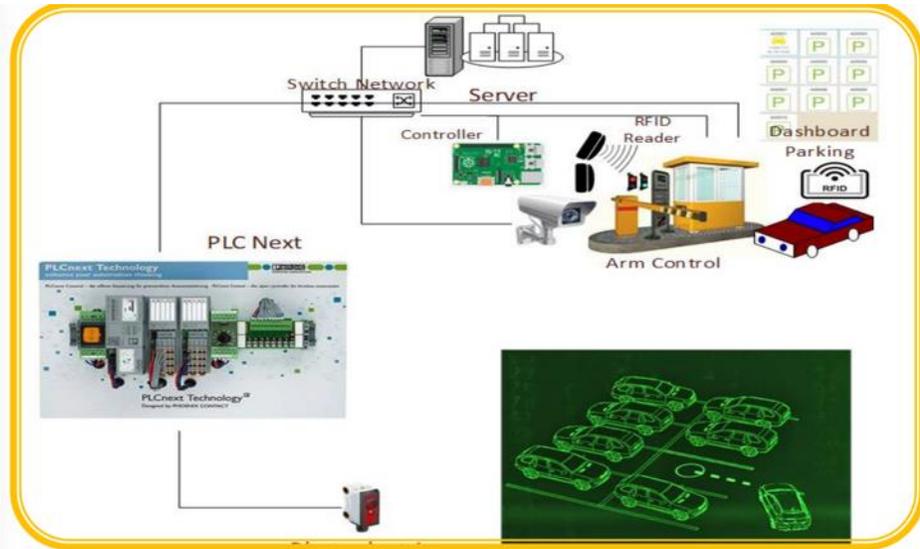
Automated Parking Lots Identification System

Body Temperature Checking and Building Access System

Next Steps, Conclusions