



**Dipartimento di Eccellenza**



**CROSSLAB**

Innovation for industry 4.0

**LABORATORIO DI CLOUD COMPUTING, BIG DATA & CYBERSECURITY**



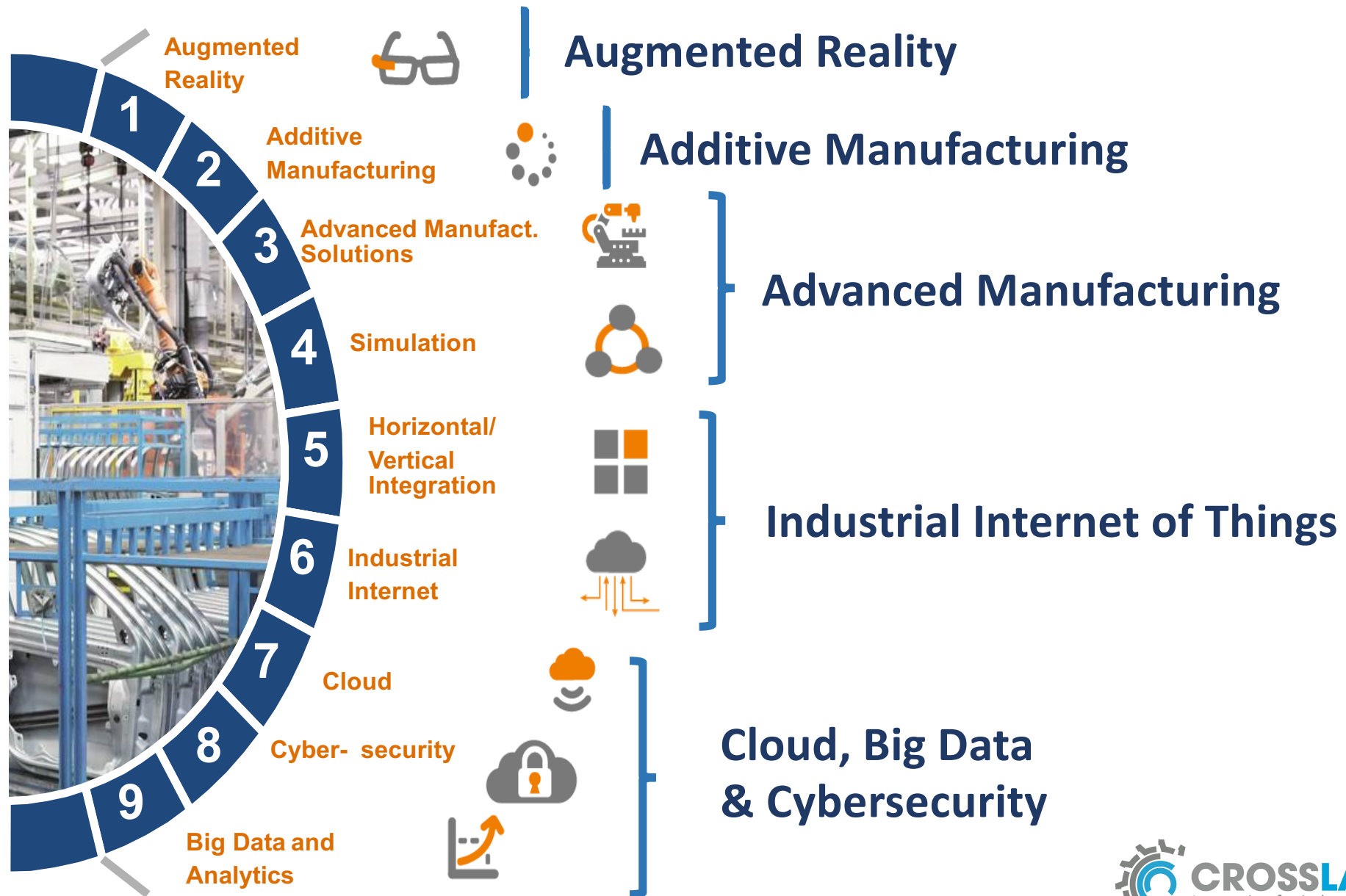
UNIVERSITÀ DI PISA



**REGIONE  
TOSCANA**

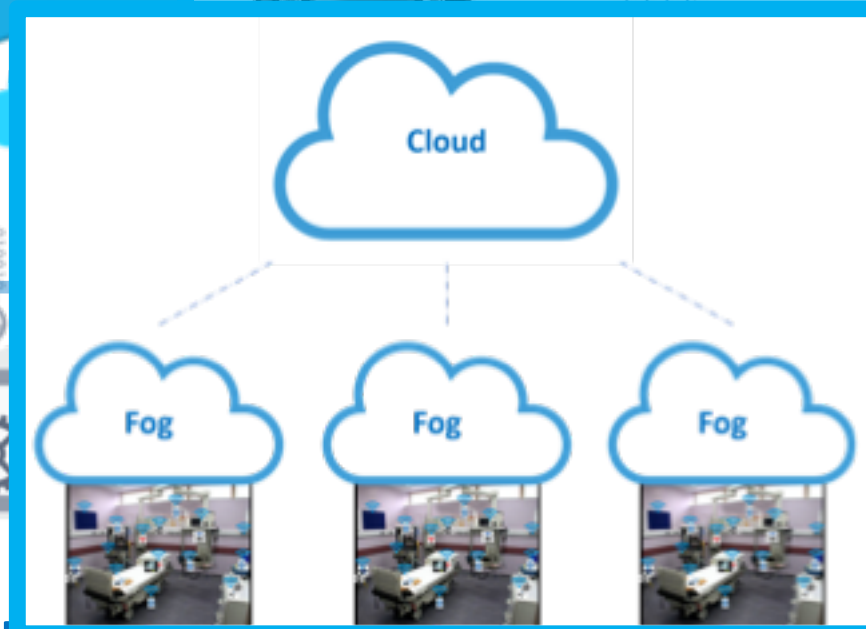
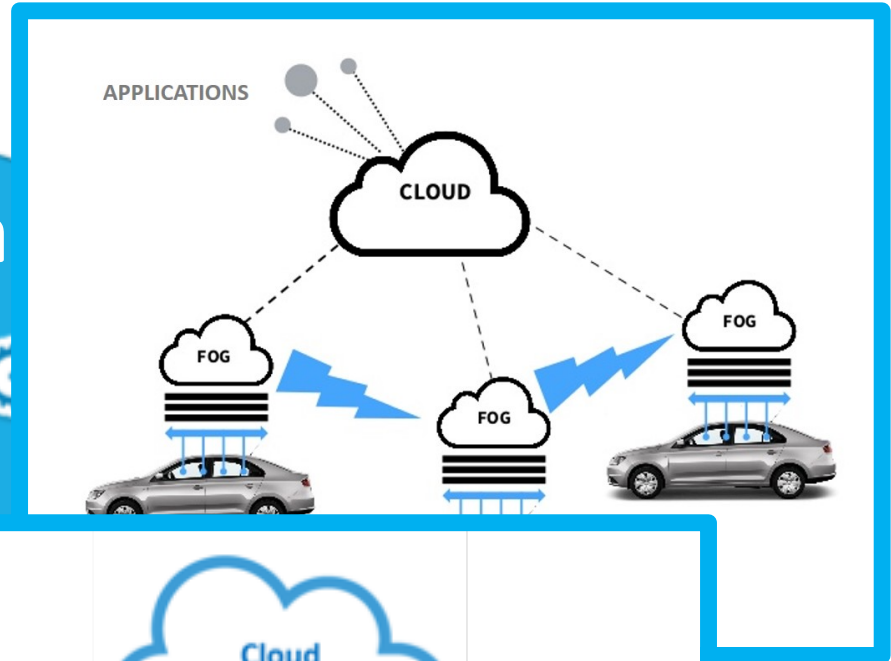
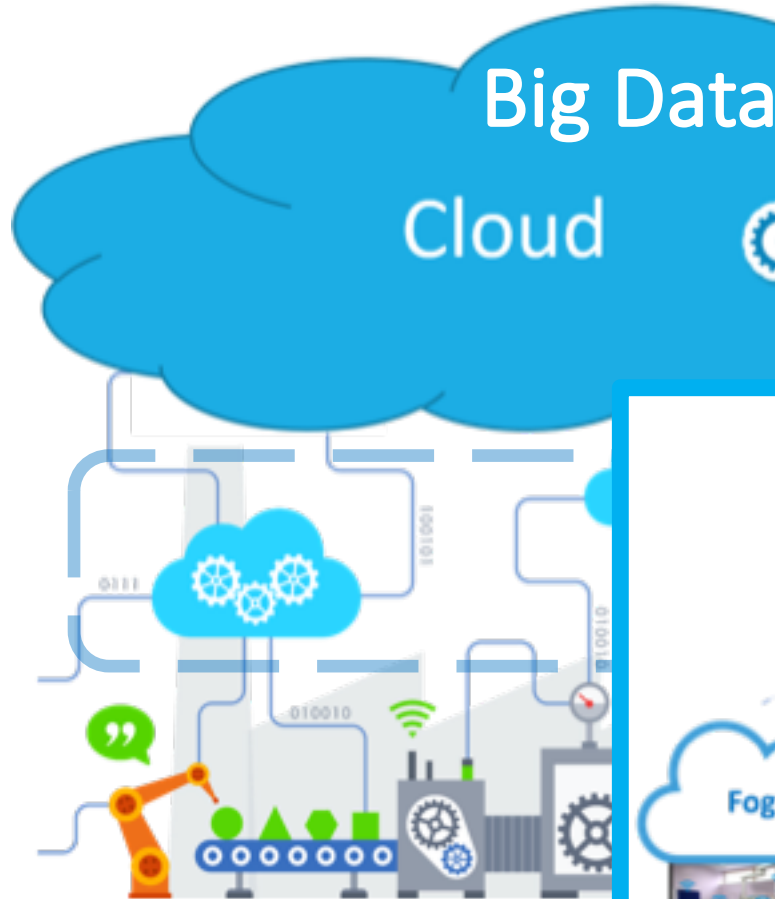


- **Interdisciplinarietà**
  - Attività organizzate in modo da stimolare l'interdisciplinarietà all'interno di ciascun CrossLab
- **Integrazione**
  - Attività organizzate in modo da favorire la collaborazione tra i CrossLab
- **Trasversalità**
  - Laboratori aperti alla cooperazione a ricercatori di altre aree disciplinari
- **Apertura alle Aziende**
  - Le PMI potranno accedere alla strumentazione e al know-how dei CrossLab

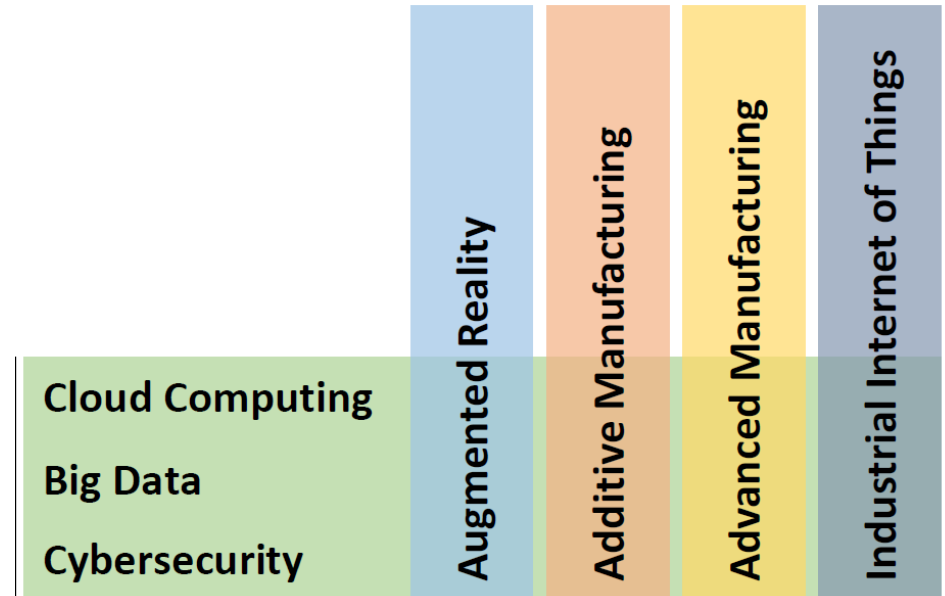


Cybersecurity

security and privacy by design



- **33** ricercatori di **3** settori  
(Ing. Elettronica, Ing. Informatica,  
Ing. Telecomunicazioni)
- *Trasversale*
- *Integrato*
- *Dall'HW all'AI,  
dall'architettura all'applicazione*





Project **OASI**

Design of Cheap High Speed Network Tools

High Speed network tools based on commodity hardware



H2020 SSICLOPS

Scalable and Secure Infrastructures for Cloud Computing

High-speed I/O for virtualization



Industrial computing platforms

Integration of IIoT devices into Cloud/Fog Computing

Programming interface



## Big Data Mining

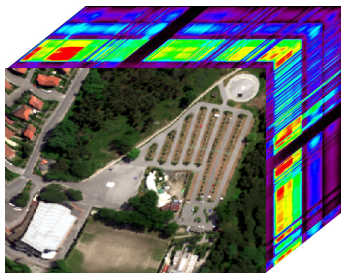
Learning algorithms, Frequent pattern analysis,  
Multi-objective evolutionary algorithms

## Profiling

Recommender systems,  
Electronic Recruitment,  
Energy Management



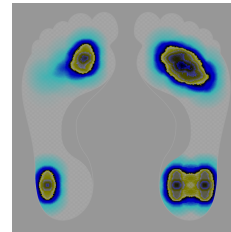
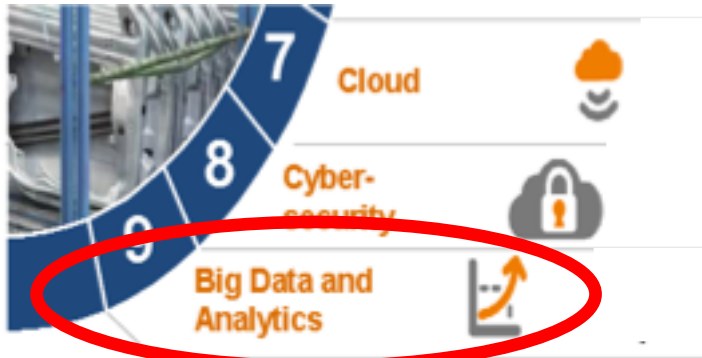
## AI & Occupational Safety and Health



## Application of the Big Data paradigm in remote sensing (RS) and Earth observation (EO)

Learning-Based Rainfall Estimation Via Communication  
Satellite Links





Behavioral analysis via smart shoes and computational stigmergy

## Forecasting

Forecasting of energy consumption/production

## Social Sensing



Opinion Mining,  
Sentiment analysis,  
Event detection, Scalable tools for  
inferring social communities



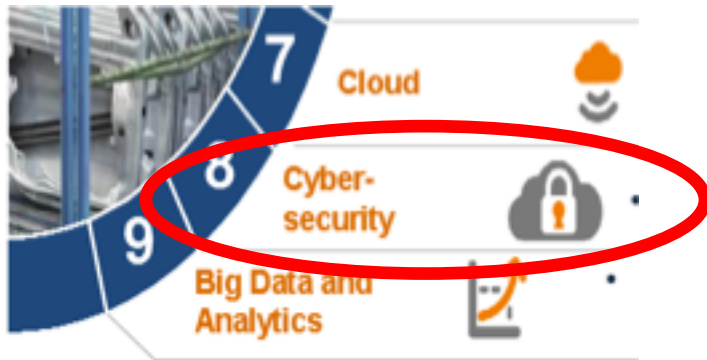
## Condition-based Maintenance

Fault Prediction, Diagnosis of the  
causes of efficiency loss in  
photovoltaic energy systems



Confort nelle auto a  
guida (semi-)autonoma  
Sensori, machine learning





Formal methods for automotive cybersecurity  
Modeling, analysis, synthesis, Architecture patterns, Secure information flow

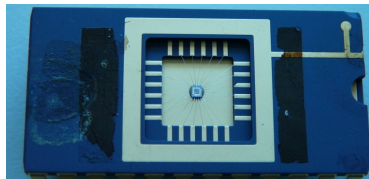


### Secure communication & storage

Key management, DDoS, secure routing, Secure localization, Privacy



Validation methods for safe and secure CPS  
co-simulation and formal-verification



### Physical Unclonable Function

CMOS HW Authentication



### CYBERWISER

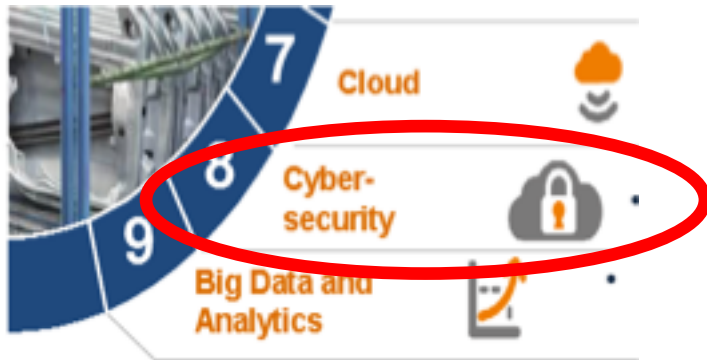
Civil Cyber Range Platform



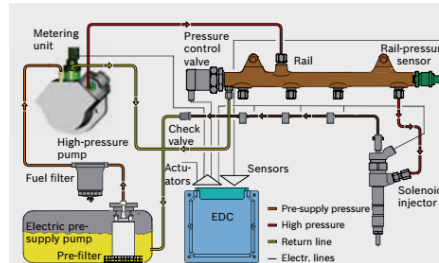
### HW-based & Embedded Cybersecurity

Cryptographic HW Accelerators and Co-processors





## CT B5 Guida Autonoma e Connessa Working Group 3 Cybersecurity



## Forensic Engineering Services Costa Concordia, Norman Atlantic, Dieselgate



### Hacking cars

Keyless, remote opening systems

Replay attack, Jam & relay attack, relay attack



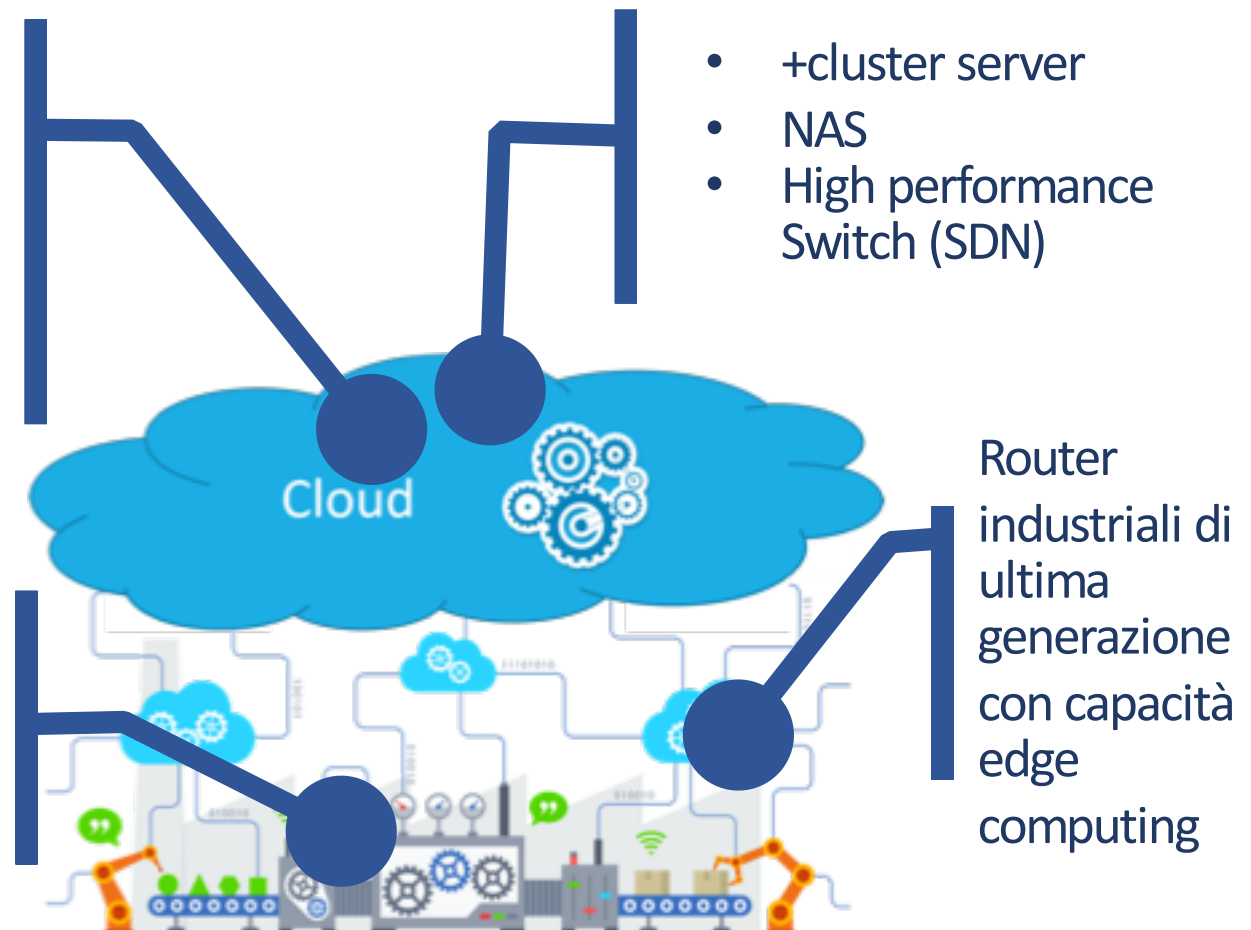
## *Già esistente*

- OpenStack Cluster di 8 server
- n.1 nodo GPU computing
- Schede Ethernet a 10 Gbit/s

## *Acquisita nel 2019*

- +cluster server
- NAS
- High performance Switch (SDN)

- Tesbed LoRaWan: 1GW + 8 sensori
- Testbed IEEE 802.15.4 di 22 nodi



SMART => HACKABLE

CONNECTED => EXPOSED

DIGITAL FORENSICS: DA ACQUISIRE **ENTRO IL 2018**

- HW & SW per acquisizione ed analisi per **Computer Forensics**
- Hw & Sw per acquisizione ed analisi per **Mobile Forensics**
- Sw di acquisizione per Infoteinment e EDR per **Automotive Forensics**

## COMPETENZE

- Progettazione
- Assessment, Gap Analysis
- Sperimentazione con il Testbed
- Consulenza su Digital Forensics
- Formazione

## STRUMENTAZIONE FORENSE

- **MASTER DI I LIVELLO IN CYBERSECURITY**
  - Partecipazione o sponsorizzazione
- **FORMAZIONE CONTINUA**
  - Corsi brevi ed intensivi: 8-16 ore, 2-4 incontri
  - Corso di perfezionamento (CFU, per iscrizione all'albo)
  - Catalogo, On-demand
- **BORSE DI DOTTORATO**



# Parliamone!



