Ubiquitous AI: Smart and Secure IoT as enabler contributors boosting servitization approach

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Security Pattern

Organizzato da

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We help creators of intelligent connected devices to **design**, **implement** and **operate** their systems with a **sustainable security level**

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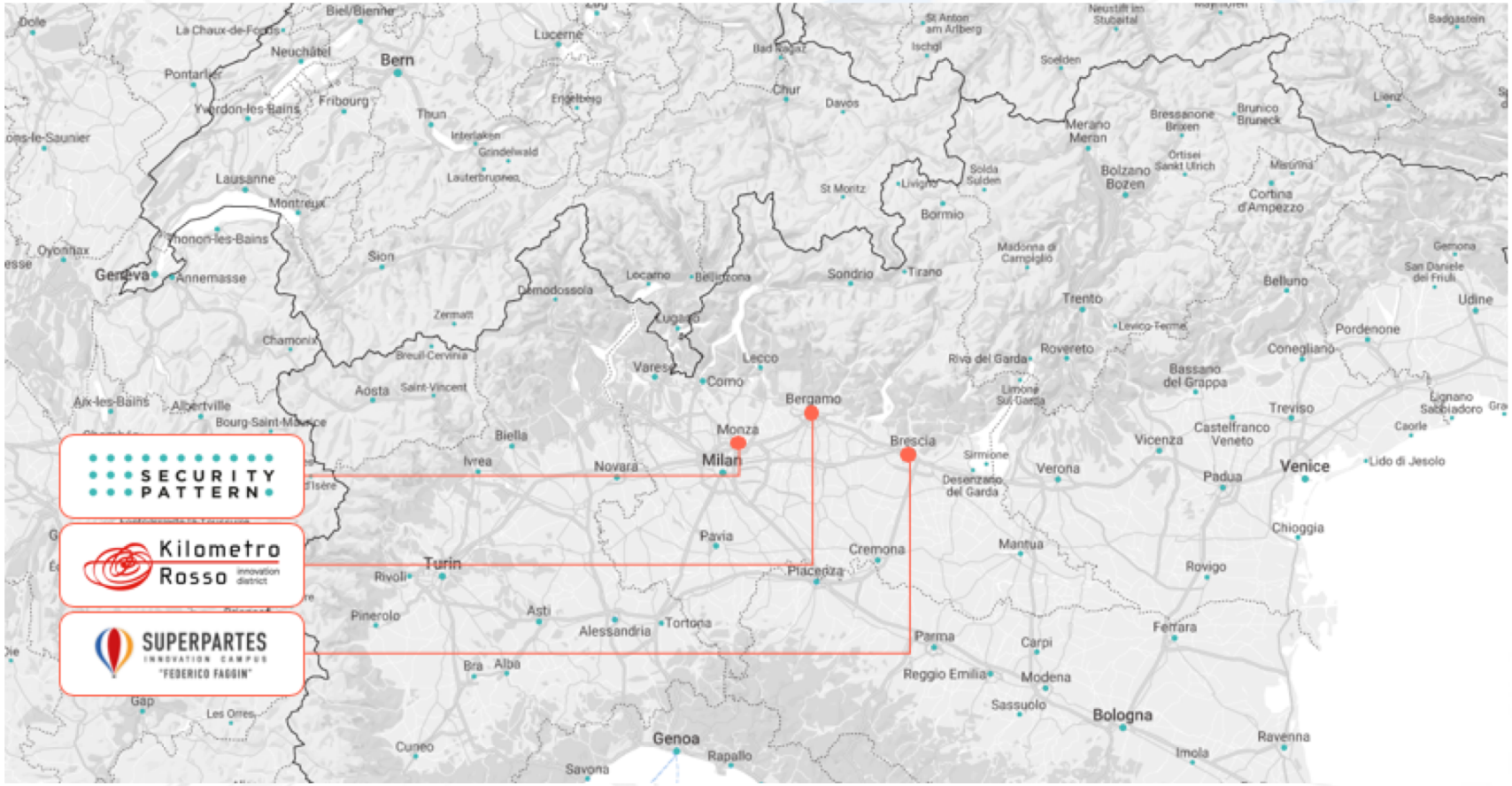
Where we are



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Data is the new Oil!

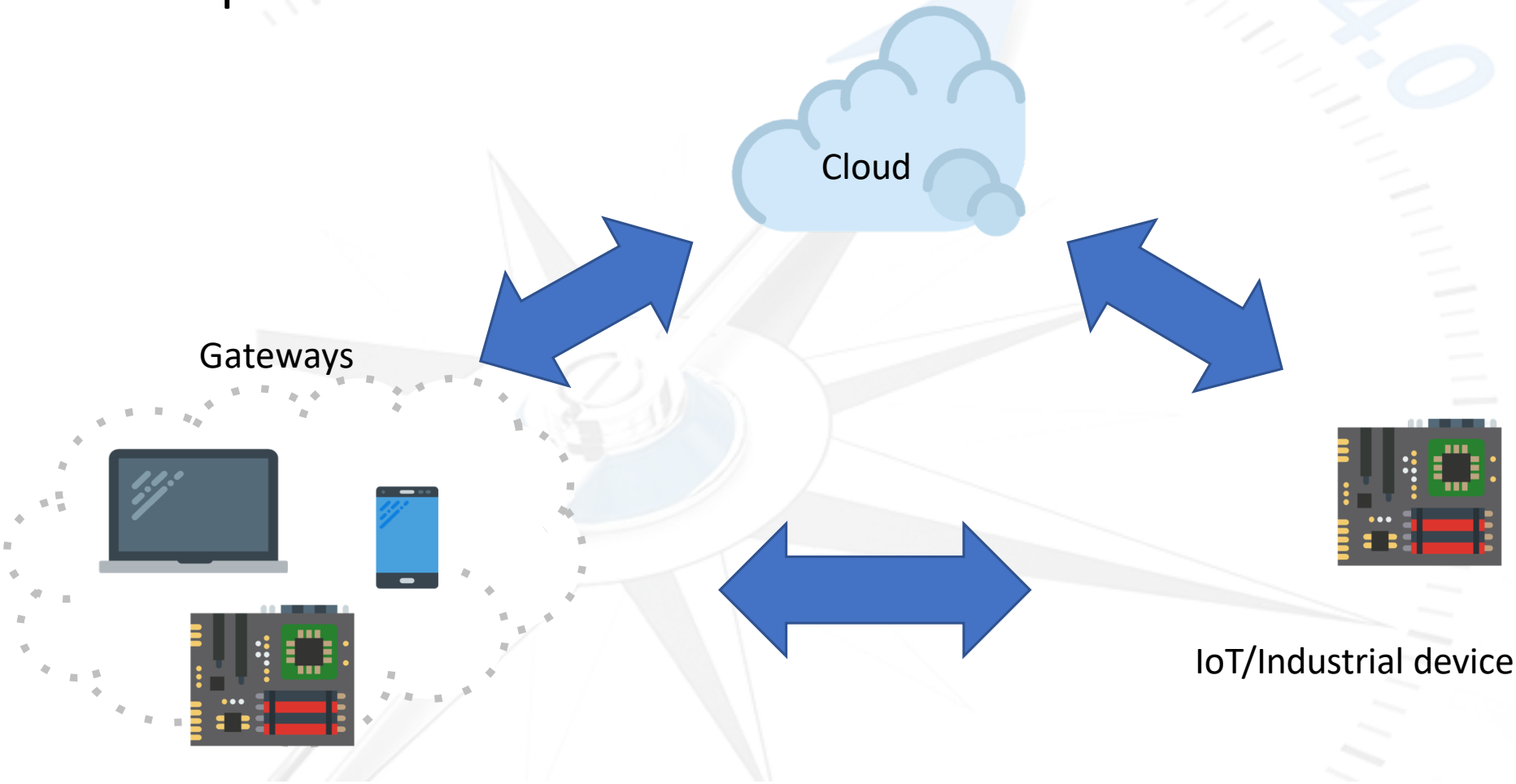
If Data is the new oil AI is the new....

- A neural network is the result of:
  - Data collection
  - Data classification
  - NN selection and training
- The synthesis of the data you collect goes in the neural network training
- This is an important asset!

Why IoT is so important

- In some contexts, like social media, raw data are provided directly by the source (users)
- In other cases raw data should be extracted from physical systems
  - with a cost for deployment of sensors, data collection, data aggregation…
- The acquisition of data from the field enables new business models and new opportunities
  - Predictive maintenance
  - Just in time manufacturing
  - Energy efficiency
  - …

Simplified IoT



Edge, fog computing..

- The scenario where “everything goes in the cloud” is not always feasible or scalable
- If the end node is not powerful enough, or for security reason the network is segregated, or there is not enough bandwidth... there might be some local computation:
  - Fog computing
  - Edge computing
  - Intelligent gateway
  - …
- The architecture can be quite complex and fragmented

What should be protected?

- Two main aspects
  - The data streams
  - The platform security

The Data Streams

- These are the “classical” IoT security requirements
- First, authenticate the counterparty:
  - Cloud authenticates IoT devices
  - IoT device authenticates cloud, gateway and other devices
- Set up a secure communication channel
  - Encrypt data, and use standard protocols, if possible, such as TLS for TCP/IP
- Use of blockchain
- Even if these requirements are now pretty understood, we are still an initial deployment phase

Platform security

- Device under attack!

- The focus is on the robustness and capabilities of being protected against attacks
- The higher the value of the data inside the device, the higher the incentive to apply attacks
- The case of pay tv....

ANSA.it › Cronaca › **Blitz anti tv pirata, stop a 5 milioni di utenti. Multe fino 25mila euro**

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Indagini in tutta Europa, nel mirino le Iptv illegali

L'operazione interessa numerosi Paesi europei: in Italia sono coinvolti 5 milioni di utenti, che saranno ora oscurati. Si tratta di un volume d'affari di 2 milioni di euro al mese….

con un abbonamento da 12 euro al mese riuscivano a guardare i programmi trasmessi dalle principali pay tv…

Standards IoT and Industrial security

- **ETSI** TS 103 645: Cyber Security for Consumer Internet of Things
- **NIST** IR 8228: Considerations for Managing Internet of Things (IoT) Cybersecurity and Privacy Risks
- **NIST** IR 8259 (DRAFT) Core Cybersecurity Feature Baseline for Securable IoT Devices: A Starting Point for IoT Device Manufacturers

- **ISA/IEC** 62443 Security for industrial automation and control system
- **NIST** SP 800-82: Guide to Industrial Control Systems (ICS) Security

Security starts in the device

- Standards are a very good start and references but do not provide the implementations...
- The security journey starts with a threat analysis
  - Identify assets and possible threats
- During the design of a device it is important to select the right components with the fundamental security primitives
  - Secure boot
  - Random number generator
  - Secure storage
  - ....

Where Neural Networks are?

- NN can be in the end node (or edge, fog..)! Not only in the cloud!
- NN can be the result of a very big effort of:
  - Data set acquisition campaign
  - Classify data with the support of experts
  - Train different neural networks for finding the best one
- Finally the network is ready to go
  - It is the result of an investment and non negligible effort
- This investment deserves protection!

Conclusions

- Artificial intelligence is becoming more and more pervasive, with the possibility of being deployed even in end nodes
- The training and the parameters of the neural network is an asset that is a result of an investment
- The asset and the corresponding investment should be protected since it is a competitive advantage
- There are suitable security solutions for protecting AI deployment

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Thank you!

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