

Internet of Things and its applications

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What's Internet of Things



IoT and its applications

CISCO'S PREVISION

In 2008 the number of things connected to the Internet was greater than the people living on Earth.

Within 2020 the number of things connected to the Internet will be about **50 billion.**

Definition

CERP-IOT: Internet of Things (IoT) is an integrated part of Future Internet and could be defined as a dynamic global network infrastructure with self configuring capabilities based on standard and interoperable communication protocols where physical and virtual 'things' have identities, physical attributes, and virtual personalities and use intelligent interfaces, and are seamlessly integrated into the information network. In the IoT, 'things' are expected to become active participants in business, information and social processes where they are enabled to interact and communicate among themselves and with the environment by exchanging data and information 'sensed' about the environment, while reacting autonomously to the 'real/physical world' events and influencing it by running processes that trigger actions and create services with or without direct human intervention. Interfaces in the form of services facilitate interactions with these 'smart things' over the Internet, query and change their state and any information associated with them, taking into account security and privacy issues.

Features

- Univocally identifiable and addressable objects
- Artificial Intelligence
- Architecture
- Geo-Localization
- Size Considerations

Tecnologies

- RFID
- WiFi IEEE 802.11
- Barcode e QR Code
- ZigBee IEEE 802.15.4
- Sensors and smartphones

RFID



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RFID

- Widely used in Transport and Logistics
- Easy to deploy: RFID tags and RFID readers
- The communication range and the frequency depends on the type of technology

WiFi



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WiFi

- Very common
- Widely used both in indoor and outdoor environments
- General purpose
- Low cost
- Highly interoperable
- Maybe not a good solution in some special conditions

Barcode e QR Code

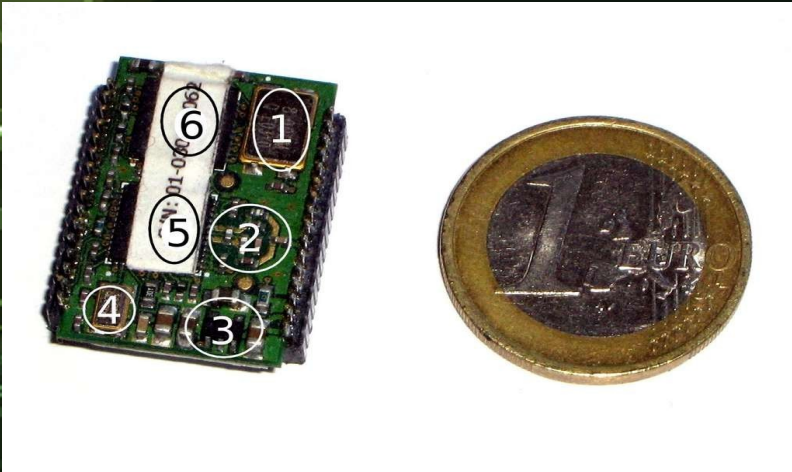


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Barcode e QR Code

- Low cost
- No technological difficulties
- Several devices can read a barcode
- Starting point for more complex systems
- Example: price comparison

ZigBee



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ZigBee

- Low cost
- Very long battery life
- Easy to deploy
- Large number of nodes (up to 64770)
- Can be used globally
- Secure
- Ideal for WPAN and mesh networks
- Support for multiple network topologies

Sensors and smartphones



IoT and its applications

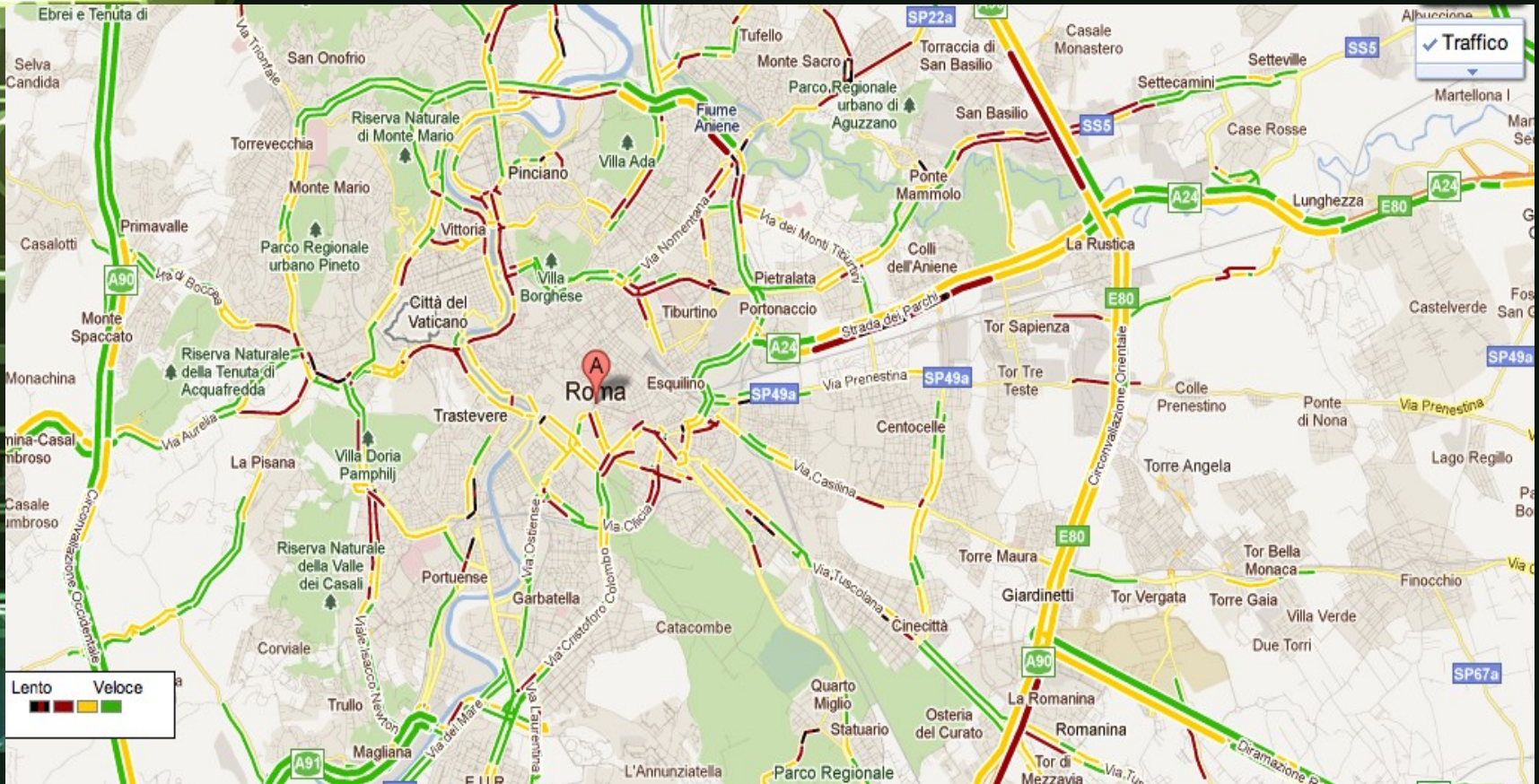
Sensors and smartphones

- In the near future almost everybody will probably have a smartphone
- A smartphone isn't just a mobile phone that has access to the Internet
- The iPhone has a lot of different types of sensors

Top Applications

- Traffic monitoring
- Health
- Security
- Transport and Logistics
- Daily life and domotics

Google Traffic



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Google Traffic

- Not exactly a IoT application
- Example of an application for everyday usage.

Jawbone UP



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Jawbone UP

- Linked to an iPhone application
- Not just a passive bracelet
- The application recommends to change life-style or diet

AutoBot



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AutoBot

- Diagnostics service for cars
- Alerts relatives in case of an accident
- Discovery service of car position
- Integrated with several web services

Transport and Logistics

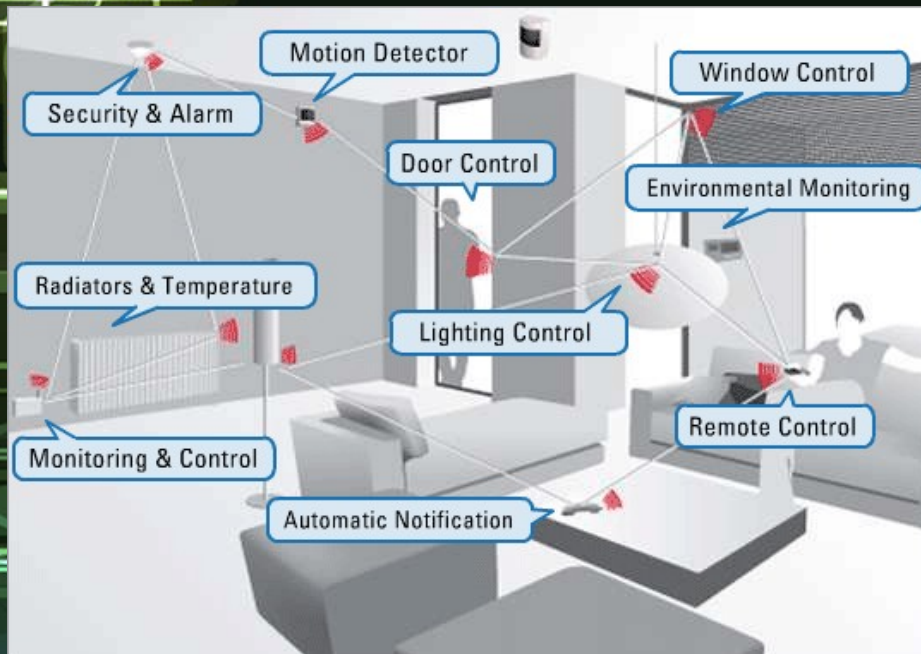


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Transport and Logistics

- One of the first business sectors interested in IoT technologies
- Currently two systems are already available and deployed: ConLock and ContainerSafe
- Integration of light sensors, GPS and GSM

Daily Life and Domotics



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Daily Life and Domotics

- Many possible developments to Domotics
- There are no standard and widely accepted solutions yet for Domotics
- A framework has been developed for Home Automation applications: FreeDom

Web of Things

To achieve IoT we need a universal protocol to combine several heterogeneous devices. This protocol should be: simple, lightweight, loosely-coupled, scalable, flexible and standard.

Sounds like the **WEB**

Web of Things

- Several technologies and protocols already available and widely accepted by the community:
 - HTTP, TCP, IPV6, XML, JSON, RSS, ATOM, REST, WS-*, URI, etc.
- URI to make the objects easily identifiable and addressable
- XML, WS-* and REST to allow the objects to expose their features and to communicate with external or centralized services
- Simpler mashup

Semantic Web

- Objects (things) are the resources
- Ontologies for knowledge representation (information collected by the objects, etc.)

Issues

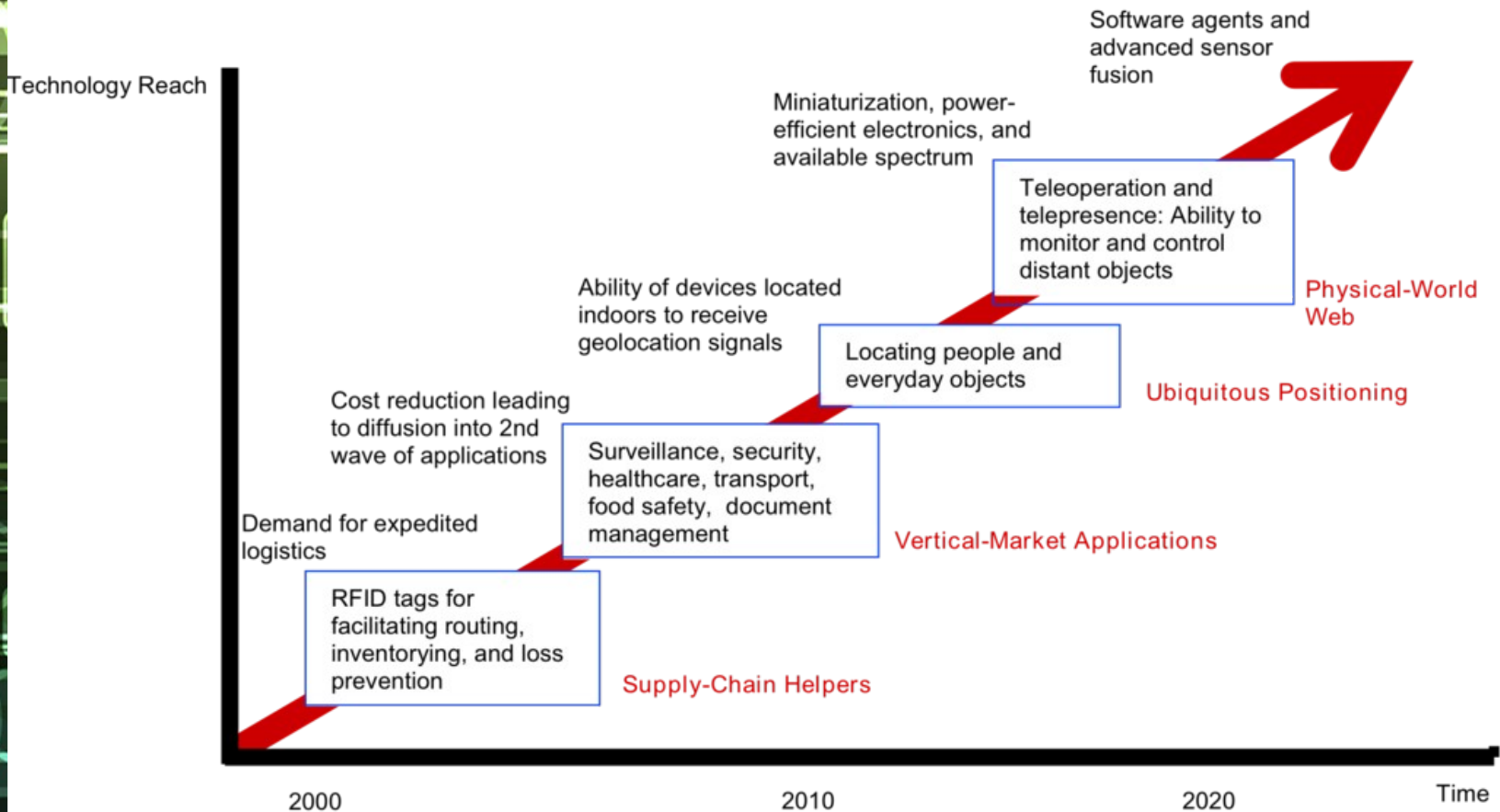
- Privacy
- Security

The future of IoT

- World sensor networks
- Home automation and domotics
- Daily life (traffic monitoring, shopping, etc.)
- Tracking and shipping of goods
- Health
- Unpredictable developments...

IoT roadmap

TECHNOLOGY ROADMAP: THE INTERNET OF THINGS



Source: SRI Consulting Business Intelligence

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References

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Thanks for your attention

Questions?