Smart Wearables

From personal health- and fitness-oriented devices (that offer biometric measurements) to smart collars that can make life easier for everyone from livestock farmers to home pet owners.

Smart Home

In the connected home – along with our computers, entertainment systems and smart TVs – numerous short-range connections that include temperature control, lighting, locks and alarms will be used.

Smart City

Efficiencies with IoT will flow from commercial building heating and security, waste collection, street lighting, power savings and enhanced traffic flow through adaptive speed limits and stop lights.

Smart Agriculture

IoT provides real cost and efficiency benefits to the agriculture industry. Potential applications include water saving through smart irrigation linked to soil analysis, monitoring crop conditions to maximize yield, tracking the health and location of livestock and providing real-time local weather information.

Connected Car

Today's network connection enables enhanced infotainment, telematics and various in-car connected systems. Vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) wireless technology, collectively known as V2X, will improve road safety, reduce traffic congestion and enhance the overall passenger experience.

Health Care

IoT greatly improves the quality and effectiveness of services by allowing healthcare system professionals the ability to monitor a patient's condition remotely: gives better information for diagnosis and doesn't require in-hospital stays.

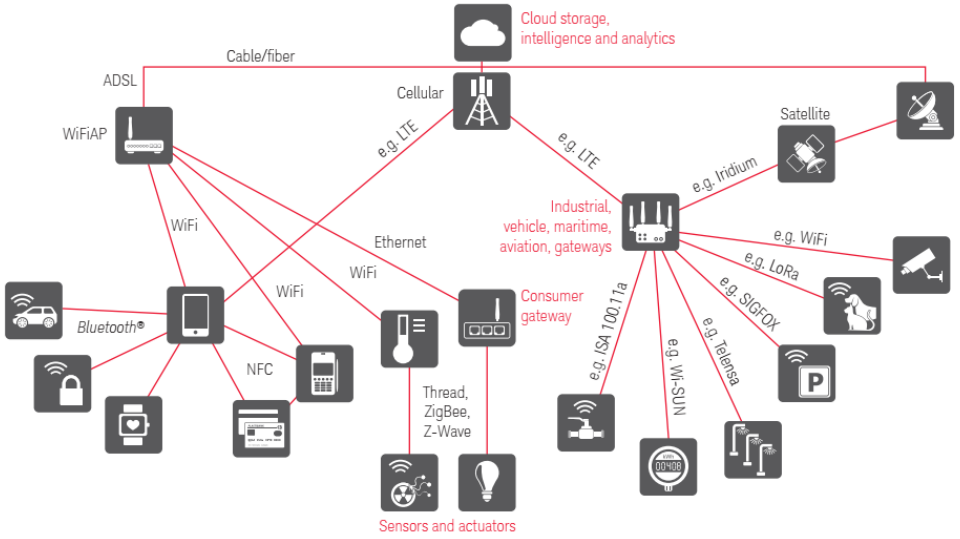
Industry Automation

Along with increased automation, it provides smart, connected and robot-based industrial production capable of learning and exchanging information resulting in highly efficient manufacturing systems and products that require far fewer resources.

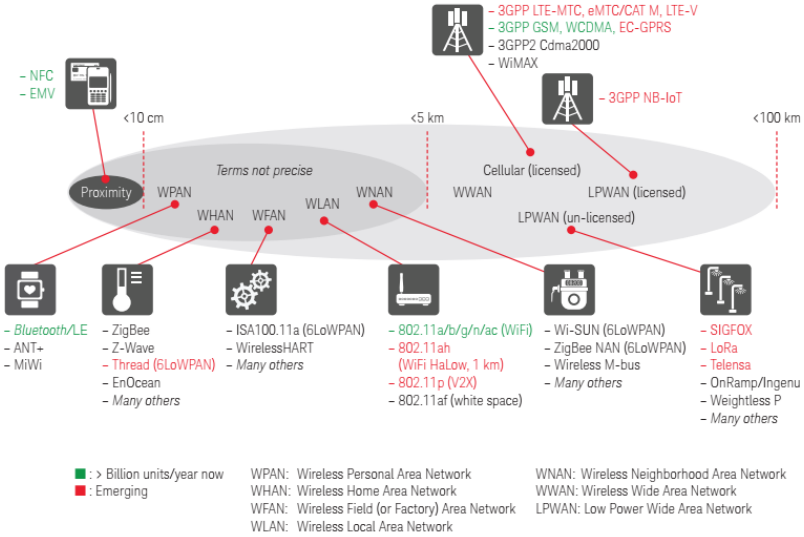
Smart Energy

IoT brings tools to monitor and measure energy usage, to reduce energy consumption and waste, and to maximize the benefits of alternative generation technologies: solar, wind, wave, geothermal and others.

Pathways and gateways for access to the cloud



IoT technologies grouped by operating range



■ : > Billion units/year now
■ : Emerging

WPAN: Wireless Personal Area Network
WHAN: Wireless Home Area Network
WFAN: Wireless Field (or Factory) Area Network
WLAN: Wireless Local Area Network
WNAN: Wireless Neighborhood Area Network
WWAN: Wireless Wide Area Network
LPWAN: Low Power Wide Area Network

Frequency bands of operation for non-cellular technologies

	54-698 MHz (TVWS)																				
Usually called	13.56	169	220			315	426	433	470	779	868	915	920	2400	5800	5900 MHz					Aliasses
NFC/EMV	◆																				ISO14443
Wireless M-Bus		◆						◆			◆										EN13757
China WMRNET								◆	◆												WMRNET I, II, III. IV
LoRa								◆	◆		◆	◆									
SIGFOX											◆	◆									
Telensa											◆	◆									
OnRamp														◆							802.15 4k
Wi-SUN													◆								802.15.4g/e/6LoWPAN
ZigBee										◆	◆	◆	◆	◆							802.15.4-2003, c d
Thread														◆							802.15.4-2003/6LoWPAN
WirelessHART														◆							802.15.4e
ISA100.11a														◆							802.15.4e/6LoWPAN
Z-Wave											◆	◆	◆								ITU G9959
EnOcean						◆						◆	◆								ISO14543-3-10
ANT+														◆							
Bluetooth														◆							802.15.1
802.11/a/b/g/n/ac														◆	◆						WiFi
802.11ah (HaLow)										◆	◆	◆	◆								WiFi HaLow
802.11p																◆					V2X
802.11af			◆																		White Space
Positive Train Ctrl			◆																		802.15.4p

Sub-GHz IC families "802.15.4" family

The red diamonds indicate the intersection of frequency band and IoT technology.

Technologies based on IEEE 802.15.4 PHY and MAC layers