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Internet das Coisas (*IoT*)
Tecnologias de Transmissão

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Internet das Coisas (*IoT*)

Aplicações de IoT

- É necessária uma organização para poder abordar todas as possibilidades de aplicações da IoT. É possível organizar essas possibilidades em seis grupos, como demostrado na Figura a seguir.
- Dessa forma, a seguir são apresentadas cada uma dessas perspectivas: casas inteligentes, cidades inteligentes, industrial, transporte e logística, saúde e agronegócio.

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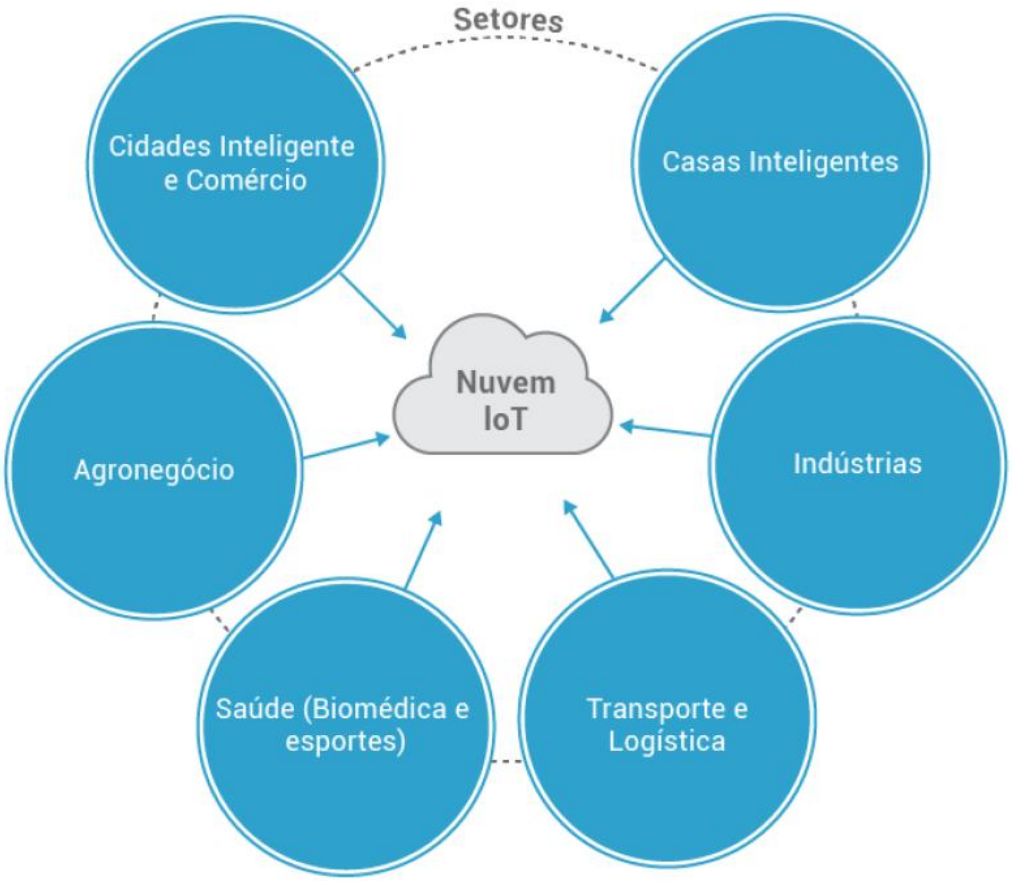
Aplicações de IoT



Legenda: FIGURA 1: CENáRIOS NA IOT.

Fonte: Stevan, S.L. (2018, p.29).

Internet das Coisas (*IoT*)

Characteristics	6LoWPAN	ZigBee	BlueTooth LE	RFID	NFC	SigFox	Cellular	Z-Wave
Standard	IEEE 802.15.4 [18]	IEEE802.15.4 [18]	IEEE 802.15.1 [18]	RFID [18]	ISO/IEC 14443 A&B,JIS X-6319-4 [30]	SigFox [20]	3GPP and GSMA, GSM/GPRS/EDGE (2G), UMTS/HSPA (3G), LTE (4G) [7]	Z-Wave [18]
Frequency Bands	868Mhz(EU) 915Mhz(USA) 2.4Ghz(Global) [12]	2.4 GHz [19]	2.4 Ghz [15]	125 kHz, 13.56 MHz, 902-928 MHz [31]	125Khz 13.56Mhz 860Mhz [15]	868MHz (EU) 902MHz(USA) [20]	Common Cellular bands [31]	868 MHz - 908 MHz [12]
Network	WPAN [23]	WPAN [23]	WPAN [23]	Proximity [10]	P2P Network [23]	LPWAN [10]	WNAN [20]	WPAN [23]
Topology	Star Mesh Network [16]	Star ,Mesh Cluster Network [19]	Star –Bus Network [16]	P2P Network [04]	P2P Network [14]	Start Network [20]	NA [05]	Mesh Network [19]
Power	(1-2 years lifetime on batteries) Low power consumption [14]	30 mA Low power [26]	30 mA Low Power [26]	Ultra-low power [05]	50 mA low power Very Low [30]	10 mW - 100 mW [20]	High power consumption [05]	2.5 mA Low power consumption [14]
Data Rate	250 kbps [15]	250 kbps [16]	1Mbps [15]	4 Mbps [18]	106 212 or 424 kbps [15]	100 bps(UL), 600 bps(DL) [20]	NA [05]	40kbps [17]

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Characteristics	6LoWPAN	ZigBee	BlueTooth LE	RFID	NFC	SigFox	Cellular	Z-Wave
Range	Short Range 10-100 m [12]	Short Range 10-100 m [12]	Short Range ~15-30 m [15]	Short Range Up to 200 m [18]	Short Range 0-10cm 0-1m 10cm-1m [15]	Long Range 10km(URBAN) 50km (RURAL) [20]	Several km [31]	30m (indoors) 100(outdoors) [12]
Security	AES [13]	AES [13]	E0 Stream AES-128 [13]	RC4 [32]	RSA AES [25]	Partially addressed [29]	RC4 [27]	AES-128 [13]
Spreading	DSSS [17]	DSSS [17]	FHSS [17]	DSSS [33]	GSMA [23]	DSSS [11]	DSSS [27]	No [17]
Modulation Type	BPSK O-QPSK [12]	BPSK/BPSK O-QPSK [12]	TDMA [17]	FSK PSK [32]	ASK [23]	UNB DBPSK (UL), GFSK(DL) [20]	BPSK OFDM [27]	BFSK [28]
Features	Commonly Used Internal Access [31]	Mesh Network [31]	Low power version available [31]	Low Cost [31]	Security [31]	Long Battery life (up to 20 years) Low Cost [10]	Longer Range [31]	Simple Protocol [31]
Common Applications	Monitor and Control via internet [31]	Home industry monitoring and controlling [31]	Wireless headsets, Audio Applications [31]	Tracking, Inventory, Access [31]	Payment, Access [31]	Street Lighting Energy meters [24]	M2M [31]	Home Monitoring and Control [31]

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Tecnologias de Transmissão

- 4G
- 5G
- Wi-Fi
- ZigBee
- RFID
- NFC (extra)
- Bluetooth
- Sigfox e Lora (extra)
- NB-IoT (extra)