Module 1

IT & ITES INDUSTRIES IN INDIA.

Topics

- IT-ITeS/BPM Industry – An Introduction,
- the relevance of the IT-ITeS sector,
- Future Skills – An Introduction,
- General overview of the Future Skills sub-sector

IT-ITeS/BPM Industry – An Introduction,

A BRIEF ON IT AND ITES INDUSTRIES & ITS GROWTH.

WHAT IS IT ?

- **As defined by INFORMATION TECHNOLOGY ASSOCIATION OF AMERICA (ITAA)**
  "IT" is the "study, design, development, implementation, support or management of computer based information system particularly software's applications & computer hardware.

IT SECTOR IN INDIA

IT sector in the country has increased at an incredible rate of 35% per year for the last 10 years reinforces the view that India is world class in IT

In IT services , India is emerging as one of the most preferred destinations for BPO'S.

It is playing an important role in economic development in a broader sense, beyond just economic growth.

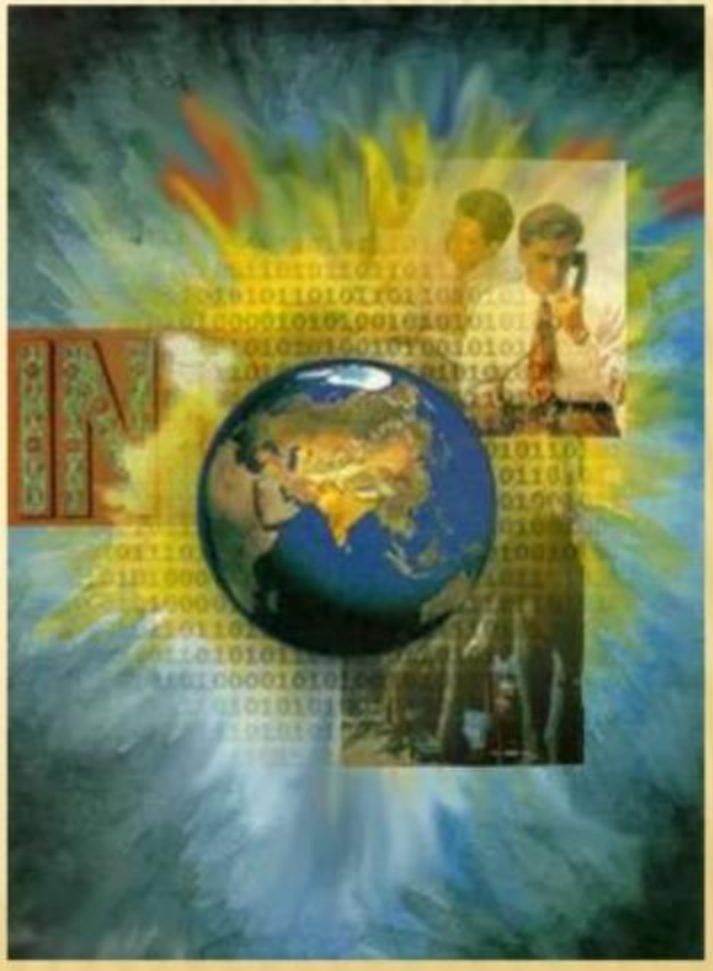
The IT sector is one of the largest employers of women, and therefore, can play a crucial role in women empowerment and the reduction of gender inequalities.

- The growth in the BPO sector under the supervision of the IT-ITES sector has been phenomenal. According to NASSCOM, "The IT-BPO sector in India aggregated revenue of US$ 100 billion in 2012, where export and domestic revenue stood at US$ 69.1 billion and US $31.7 billion respectively".

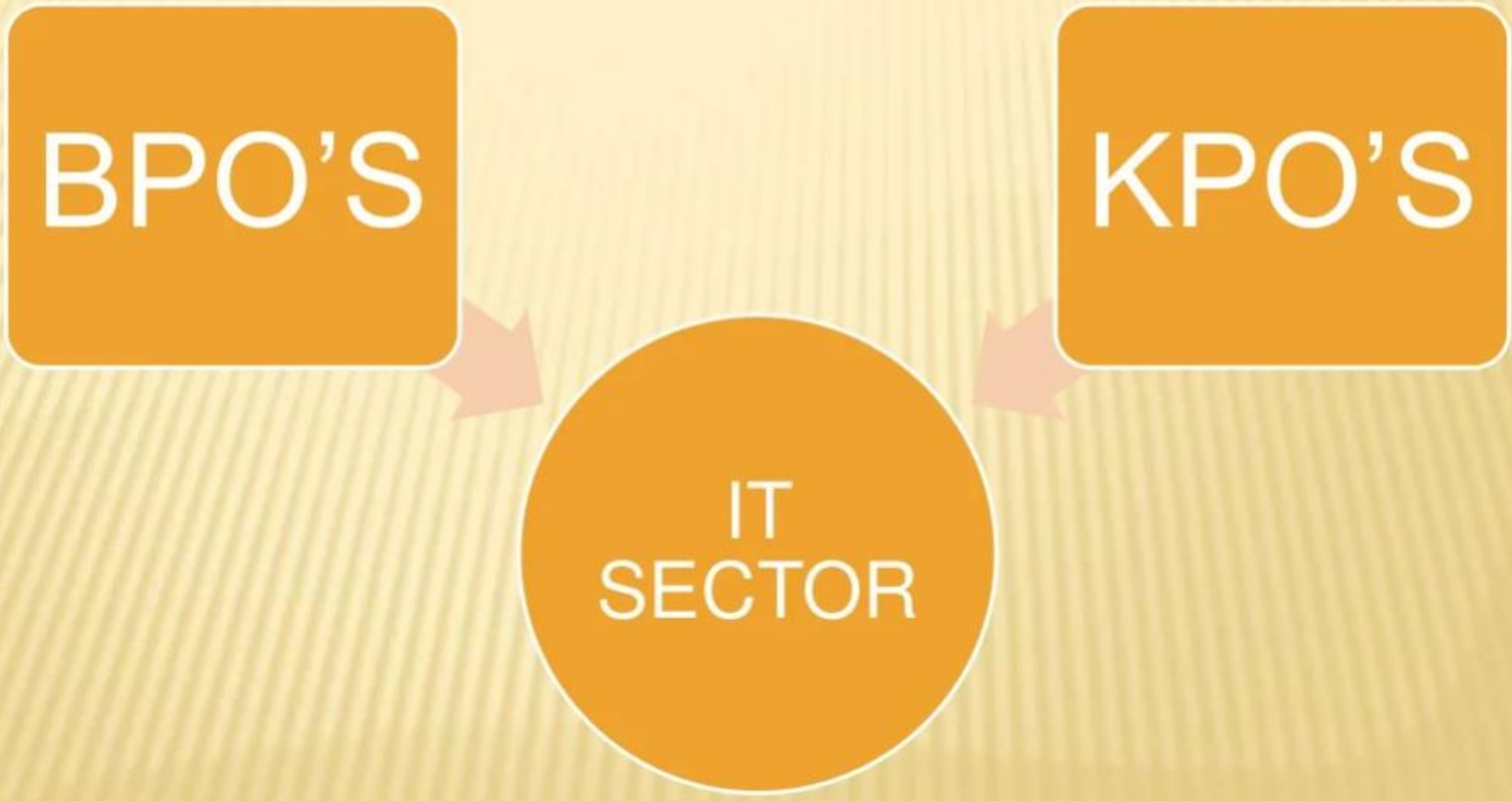
- The estimated employment generation in the 2012 was an expected 230,000 thus providing direct employment to 2.8 million and indirect employment 88.9 million people all over the country. According to a report prepared by Gartner, the top five outsourcing companies of India are TCS, Cognizant, Infosys, Wipro and HCL Technologies.

ERALIZATION OF THE ECONOMY & THE SEEDS OF IT BOOM IN INDIA

- Abolition of licenses
- Rationalization of taxes
- Export thrust
- Reduction of import tariffs
- Abolition of wealth tax
- Foreign exchange reforms
- Free pricing of IPOs
- Foreign portfolio investments
- Employee stock option plans



IT SECTOR INCLUDES....



WHAT IS TRAINING & DEVELOPMENT:-

- A learning process and task oriented activity.

- The process of teaching new employees the basic skills they need to perform their jobs.

- Effective trainings convey relevant and useful information that inform participants and develop skills and behaviors that can be transferred back to the workplace.

- **Edwin B. Flippo** :

"Training is the act of increasing the knowledge and skill of an employee for doing a particular job.'

DESIGNING OF TRAINING & DEVELOPMENT PROGRAM

SPENDINGS ON TRAINING & DEVELOPMENT:-

- Indian organizations on average spent US $331 per employee on training and development in 2011, according to a study on learning and development trends in India, by the American Society for Training & Development (ASTD) and Harvard Business Publishing (HBP).
- The figure includes learning and development staff salaries, travel costs for L&D staff, administrative costs, non salary development costs, delivery costs (such as classroom facilities and online learning technology infrastructure), outsourced activities and tuition

- In terms of IT industries,Infosys annually spends over Rs 800 crore (Rs 8 billion) on training alone. Wipro spends about 2 per cent of its net sales in providing training to employees.
- Infosys is rated amongst world best in employees training and development.

Training Expenditure—Indian Experiences (2007)

S. No.	Company	HR Cost (Crores)	Training Budget (Crores)	Training Mandays
1.	Microsoft India	227.3	0.546	12270
2.	Mindtree	15.2	3.52	66000
3.	Johnson & Johnson	1.78	0.54	510
4.	Infosys Technologies	218	0.003 (per employee) (667 Cr in 2005-06)	12
5.	iGate	9.5	5.32	10
6.	HCL Comnet	30.24	25.68	43000
7.	Dr. Reddy's Lab	267.2	5.00	25000
8.	Marriott Hotels India	1.07	1.36	4337
9.	Covansys	15.76	6.4	27788
10.	HCL Info systems	31.8	1.1	52708
11.	Godrej Consumers	1.00	0.69	3042.58
12.	Honeywell Technologies	12.21	5.16	21750

Source: Business Today, November, 18, 2007

The relevance of the IT-ITeS sector

Case Study

CURRENT CHHATTISGARH PERFORMANCE IN IT SECTOR.

CHHATTISGARH(C.G)

- **Chhattisgarh** state was formed on 1 November 2000.Raipur was made its capital city. C.G is a state in Central India . It is the 10th largest state in India . With a population of 25.5 million, Chhattisgarh is the 16th most-populated state of the nation. It is a source of electricity and steel for India . Chhattisgarh accounts for 15% of the total steel produced in the country. Chhattisgarh is one of the fastest developing states in India.
- C.G is generously best toward with natural resources like- forests , minerals & surface water.
- South eastern coal field limited, NTPC have presence in state.

But in IT sector chhattisgarh do not have any big company.

CG PERFORMANE FOR IT COMPANIES:-

- In recent years, Chhattisgarh is also getting exposure in information technology (IT) projects and consultancy.
- Its government is also promoting IT and has set up a body to take care of the IT solutions. The body, known as CHIPS , is providing large IT projects such as Choice, Swan, etc.

WHAT IS CHIPS –

- Chhattisgarh infotech and biotech Promotion Society (CHiPS) has been set up to give impetus to IT growth in the State and implement initiatives for overall socio economic development.

- CHiPS ensures top-of-the-board institutionalised coordination and implementation of State's plans for enabling benefits of IT to every one.

CG PERFORMANE FOR IT COMPANIES:-

Companies of IT in c.g :-

- **Nimble Technologies**:

  Software Development Company, Website Designing

  IT company korba.

- **Prima Softtech.com**

  Prima softtech as a provide IT services, consulting and business solutions partner,

  IT companies Bilaspur.

- **Mini Infotech**

  IT companies raipur.

INTRODUCTION OF IT POLICY

Chhattisgarh announced many initiatives in the IT sector, which deliver significant benefits to all the citizens & all the businesses.

Our state vision of pioneering e-Governance initiatives in India that serve as a benchmark for others to follow.

IT Policy is culmination of our clear vision and goal of leveraging the potential of Information Technology for rapid social and economic development aimed at significantly improving the quality of life for all citizens of the State.

The Government of Chhattisgarh visions ***'Vikas mool mantra, Aadhar loktantra' ('Driving* Development through Democratic Governance')** **and** believes Information and Communication Technology (ICT) is a particularly important medium for the state in reaching out and improving livelihoods specially for its overwhelming SC / ST population across 44% forest area, which had largely remained untouched by modern development.

- An overwhelming proportion of this population are dependent upon agriculture and forest for their basic livelihood. Despite significant bottlenecks of limited access to market related information, monsoon forecasts, government schemes etc. ICTs has the potential to significantly improve this contribution.

- The State's IT Policy has been designed to achieve the Governments vision of creating an ***'enabled Society effectively contributing to the Social and Economic Development of the State'.***
- The state seeks to create a knowledge society where access to information and knowledge would be symmetric amongst all seekers and users and every citizen must feel comfortable in accessing information through IT.

OBJECTIVE OF IT POLICY

- To create job creators rather than job seekers.
- To establish Chhattisgarh as the leading destination of choice for IT investments.
- To provide an enabling environment for a robust growth of local IT industry in the State.
- Leveraging IT for improving governance in the state.
- Taking internet to masses for facilitating information access.

TARGETS

- Ensure anytime and anywhere connectivity setting the stage for fostering a competitive IT Industry. This approach besides resulting in additional employment and raise incomes would lead to productivity and better services in other sectors.
- Provide all citizens widespread and easy access to government services at an affordable cost and in local language by setting up Integrated Service Delivery Centres across the entire state.

- 100% IT literacy in all schools and colleges in a phased manner.
- Promote entrepreneurs, increase investment and employment.

DEVELOPMENT STRATEGIES

- **Technology enabled governance**

  To start the use of IT , develop the market for IT product, the Government would maximise the use of technology in all its processes. In doing so Government Process Reengineering would be encouraged wherever necessary.

- **Infrastructure and Human Resource Development**

  The State should build best-in class education, training facilities and R&D infrastructure to equip its citizens. State should work towards establishment of software parks and extension. An Information Technology University will be

Extended Government support for Information Technology Development

Chhattisgarh has very high priority to Information Technology. IT has been identified as a 'Special Thrust Sector' industry in the Industrial policy.

The some incentives are –

- Interest subsidy on term loan and working capital paid by SSI.
- Subsidy on Capital Investment by SSI.
- Subsidy on Commercial Tax paid within the State.

- Exemption from payment of electricity duty for new units.
- Subsidy on Allotment of land premium.
- Exemption from payment of entry tax.
- New small scale industries will be given full exemption from payment of land revenue on diverted land up to a maximum of 5 acres.
- Reimbursement of up to 50% of the fee paid up to Rs.75,000/- for an ISO or any international certification.
- NRI and FDI investors will be eligible to get additional 5% directed incentives more than general category investors.

Table 1: Differences between IT Services and Business Process Services

Major Differences between IT Services and ITES Business Process Services	ITeS BP Services	IT Services
Customer Stakeholders	CEO, CFO, COO Business/ Functional Heads	CIO/CTO
People	Operational	Technical
Process	Minimal onshore presence; Domain Knowledge Centric	Combination of onsite and offshore Technology Centric
Technology	Mostly driven by customer preference	Service provider has major stake

BPM

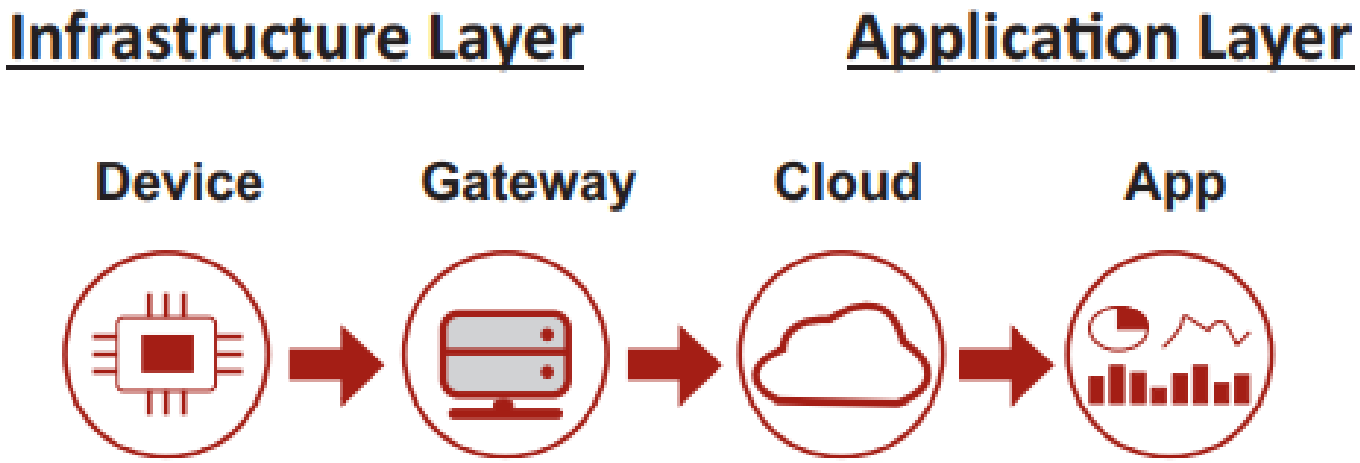
- Business Process Management (BPM) is a process in which people use various methods to analyze, measure, improve and optimize the process. Sometimes people even end up discovering new business processes. The foremost aim of a BPM is to improve the corporate performance by managing the business processes.

Life Cycle of BPM

- Design: Break the process into multiple tasks.
- Model: Model it using suitable BPM software.
- Execute: Execute the processes or put a system in place.
- Monitor: Monitor and analyze the system.
- Optimize: Make change to the process to improve it.

IoT Working

How does IoT Work - IoT working mechanism



The principal technologies that drive IoT system

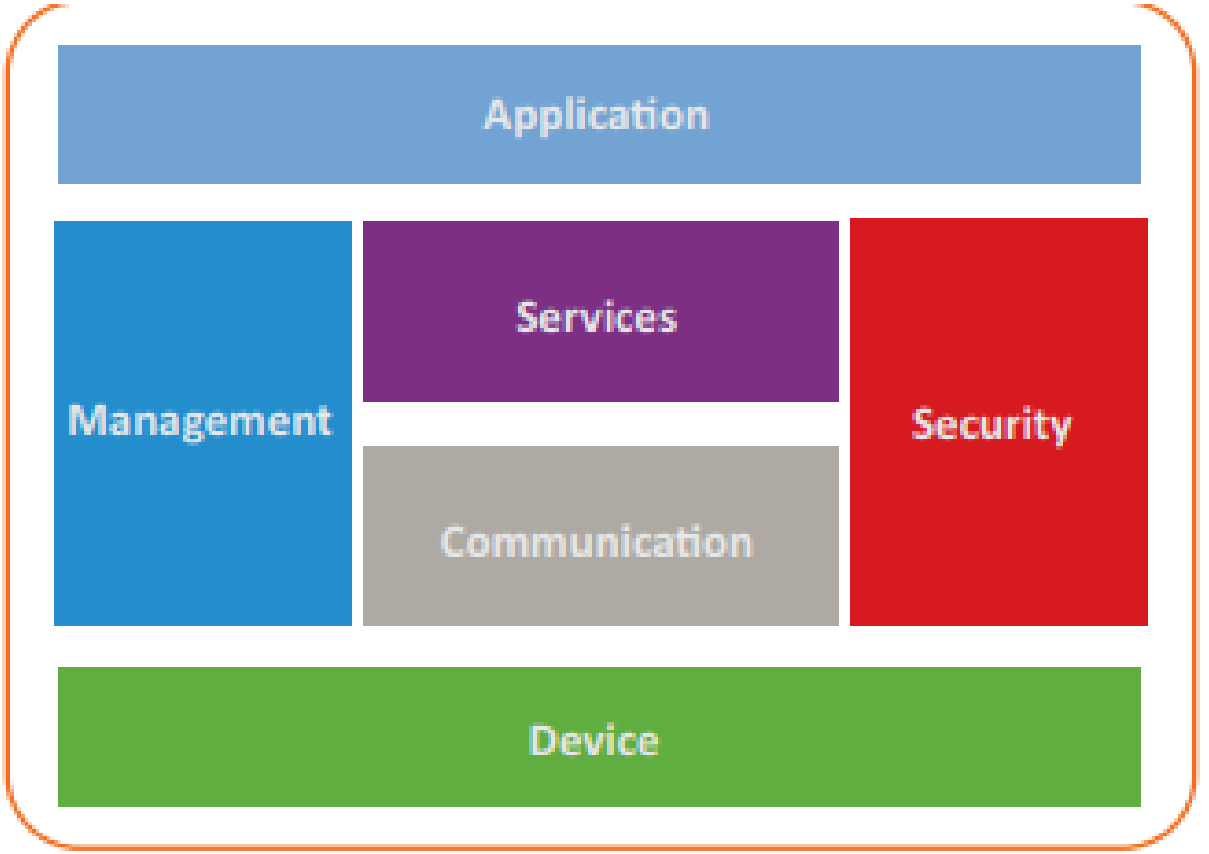
The principal technologies that drive IoT system are:

- **Wireless Sensor Networks**
- **Embedded Systems**
- **Communication Protocols**
- **Cloud Computing**
- **Big Data Analysis**

IoT Functional Blocks

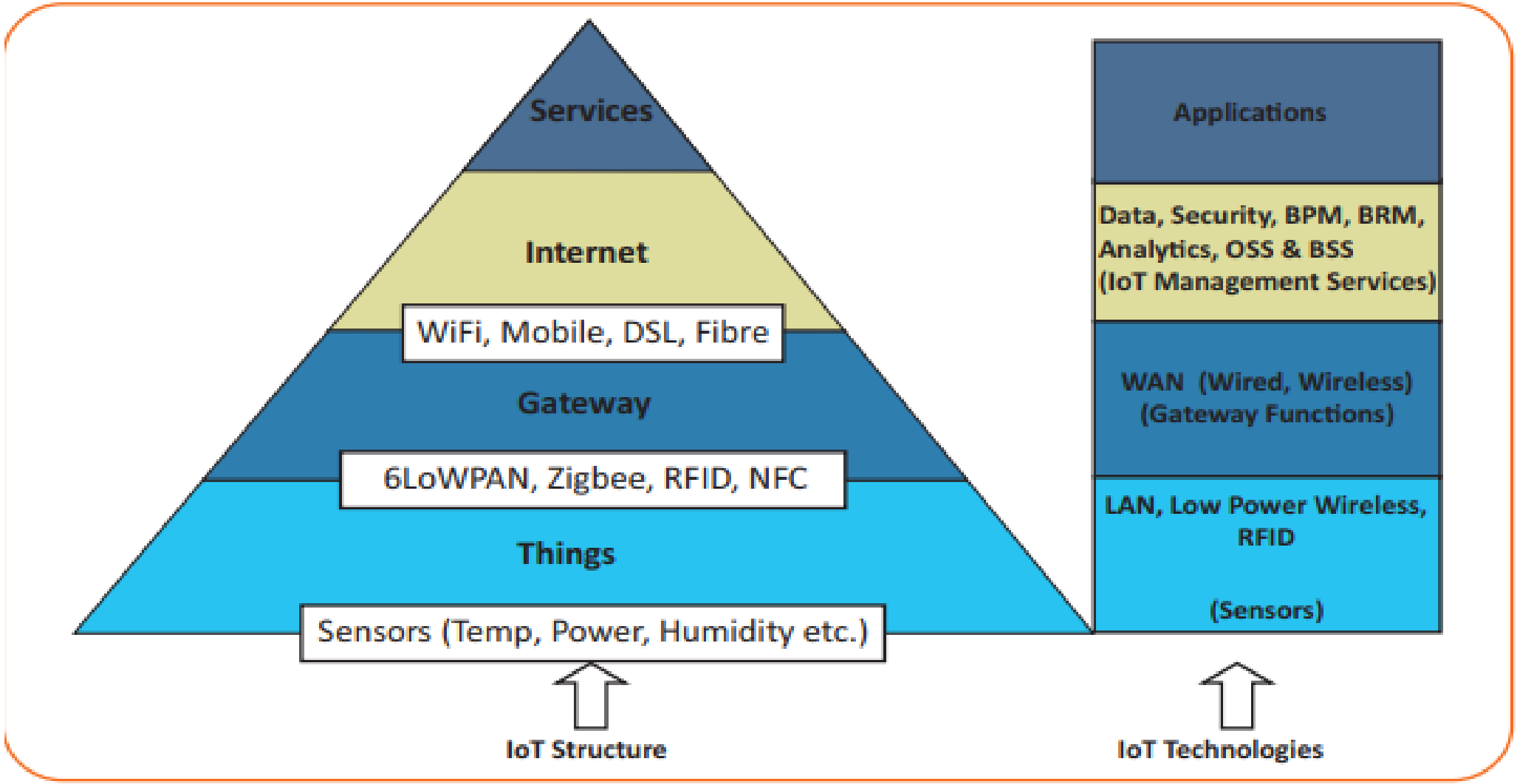
The IoT system comprises of the following functional blocks:

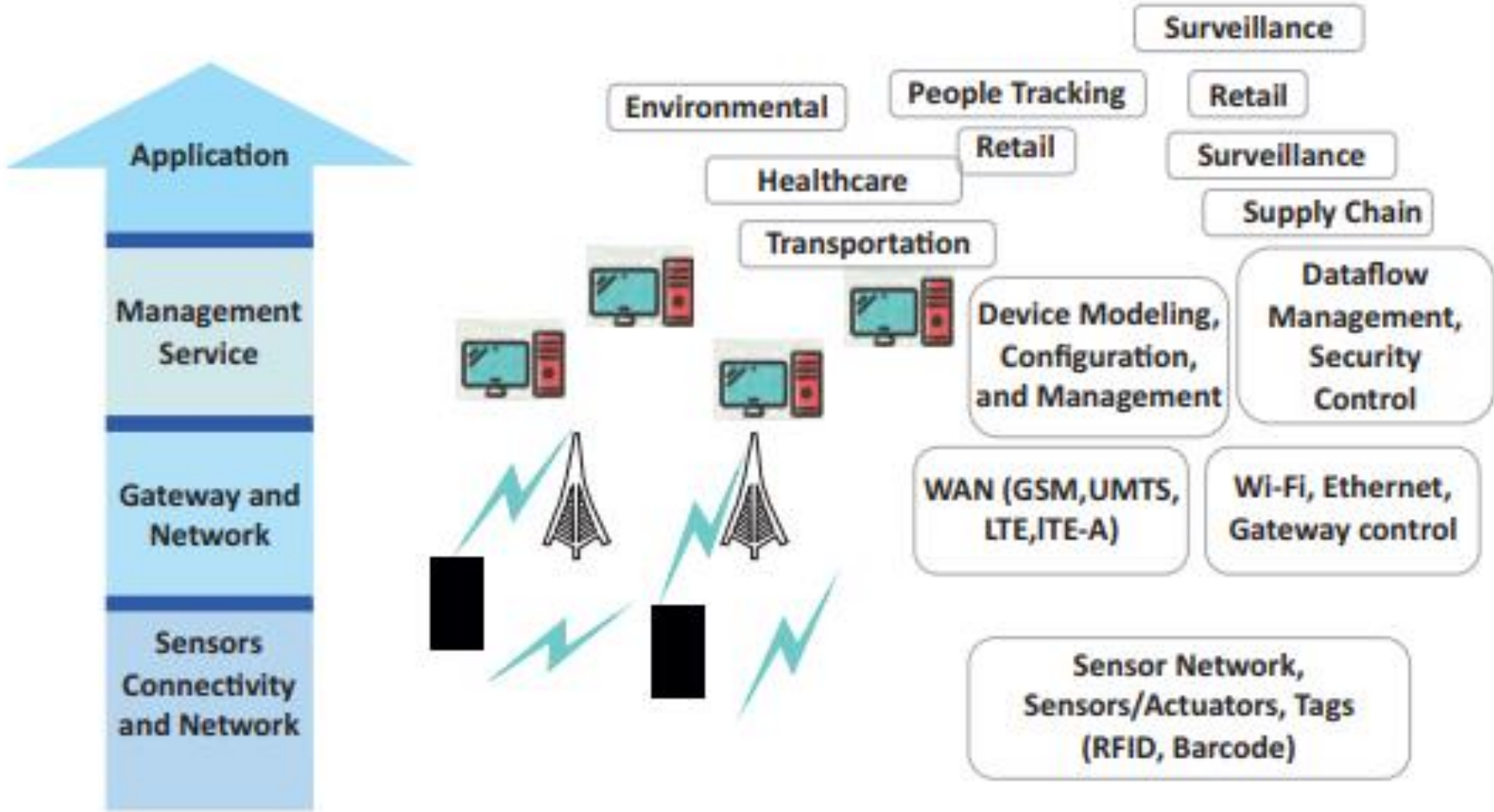
- Devices
- Communication
- Services
- Management
- Security
- Application



The data management includes data collection, processing, storage and triggering, real time processing, big data analysis.

Architecture - IOT




Application
Management Service
Gateway and Network
Sensors Connectivity and Network
Surveillance
People Tracking
Retail
Environmental
Retail
Surveillance
Healthcare
Supply Chain
Transportation
Dataflow Management, Security Control
Device Modeling, Configuration, and Management
WAN (GSM,UMTS, LTE,ITE-A)
Wi-Fi, Ethernet, Gateway control
Sensor Network, Sensors/Actuators, Tags (RFID, Barcode)

Sensors used in IoT systems.

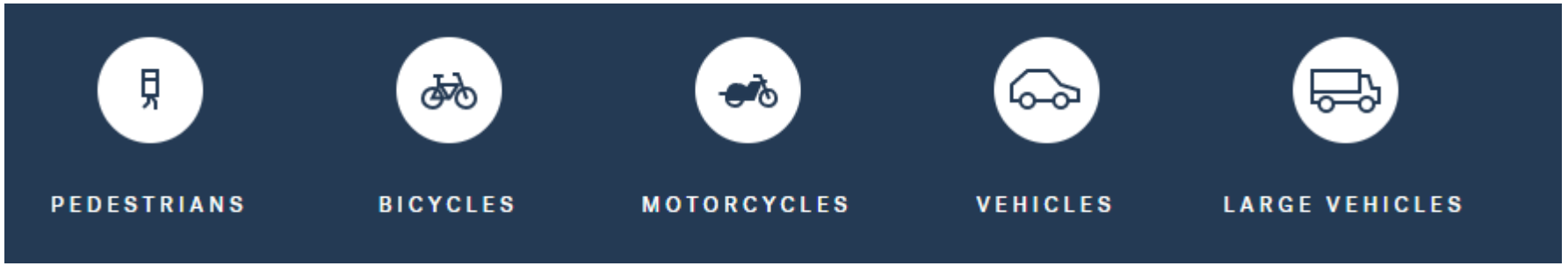
- Mobile processor as a possible IoT connecvity
- A modern Smartphone is equipped with sensors such as:
  - **motion sensors**
  - **accelerometers**
  - **magnetometer and compass**
  - **environmental sensors like thermometers, barometer (pressure sensor)**
  - **cameras**
  - **microphones etc**

Example – Mobile usage as IOT

- One example of an actual use of the Internet of Things could be to observe **traffic congestion** on specific roads with Google Maps.

Placemeter

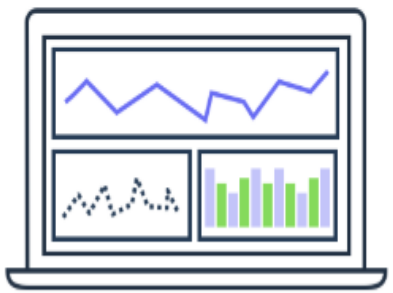
- **Placemeter Turns Video Into Meaningful Data**
- Since 2012, this platform has processed thousands of **video streams** and has automatically analyzed billions of movements, in real-time.



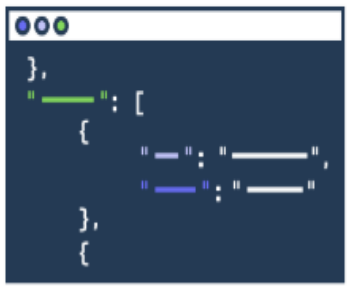
Scalability and Machine Learning

- Placemeter is robust and built to scale.
- First, the system handles an ever-increasing amount of video streams.
- Second using machine learning, the algorithms process video and classify objects in a wide range of new contexts.
- A series of algorithms first separate moving objects from the background.
- Computer vision cascades then classify those objects as pedestrians, bicycles, motorcycles, vehicles and large vehicles.

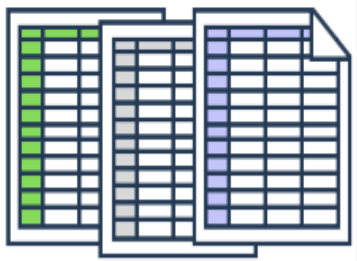
You get quick and easy access to your data through our Dashboard, API and Exports.



Dashboard



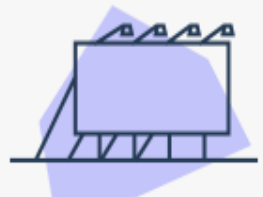
API



Exports

Solutions

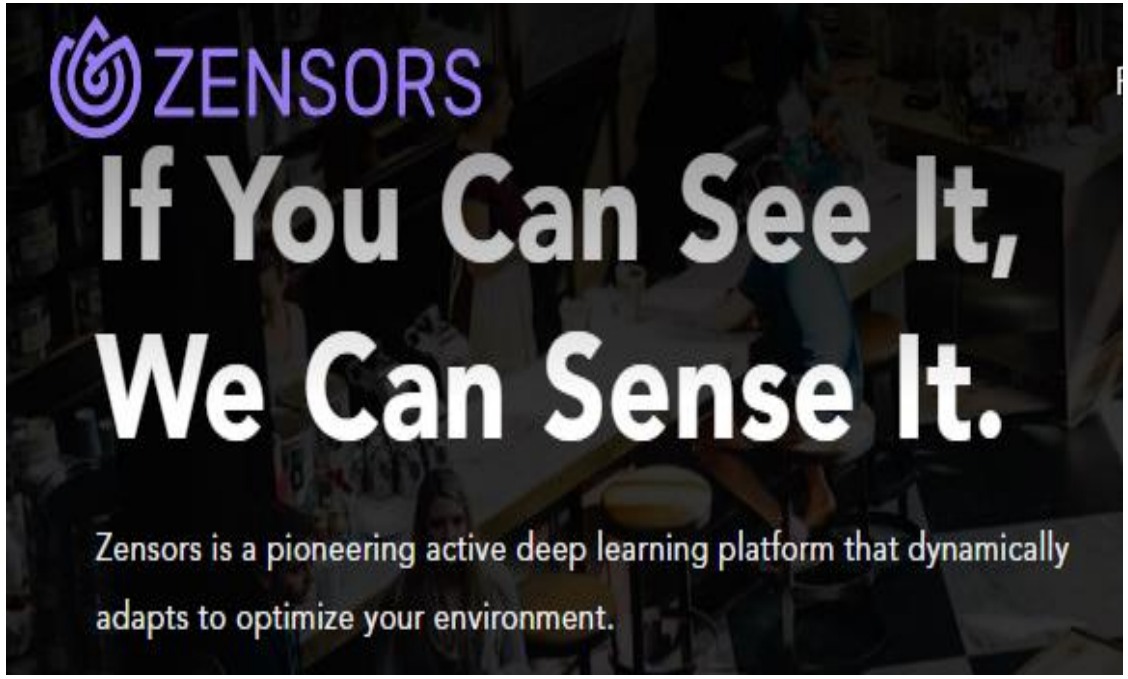
Smart Cities



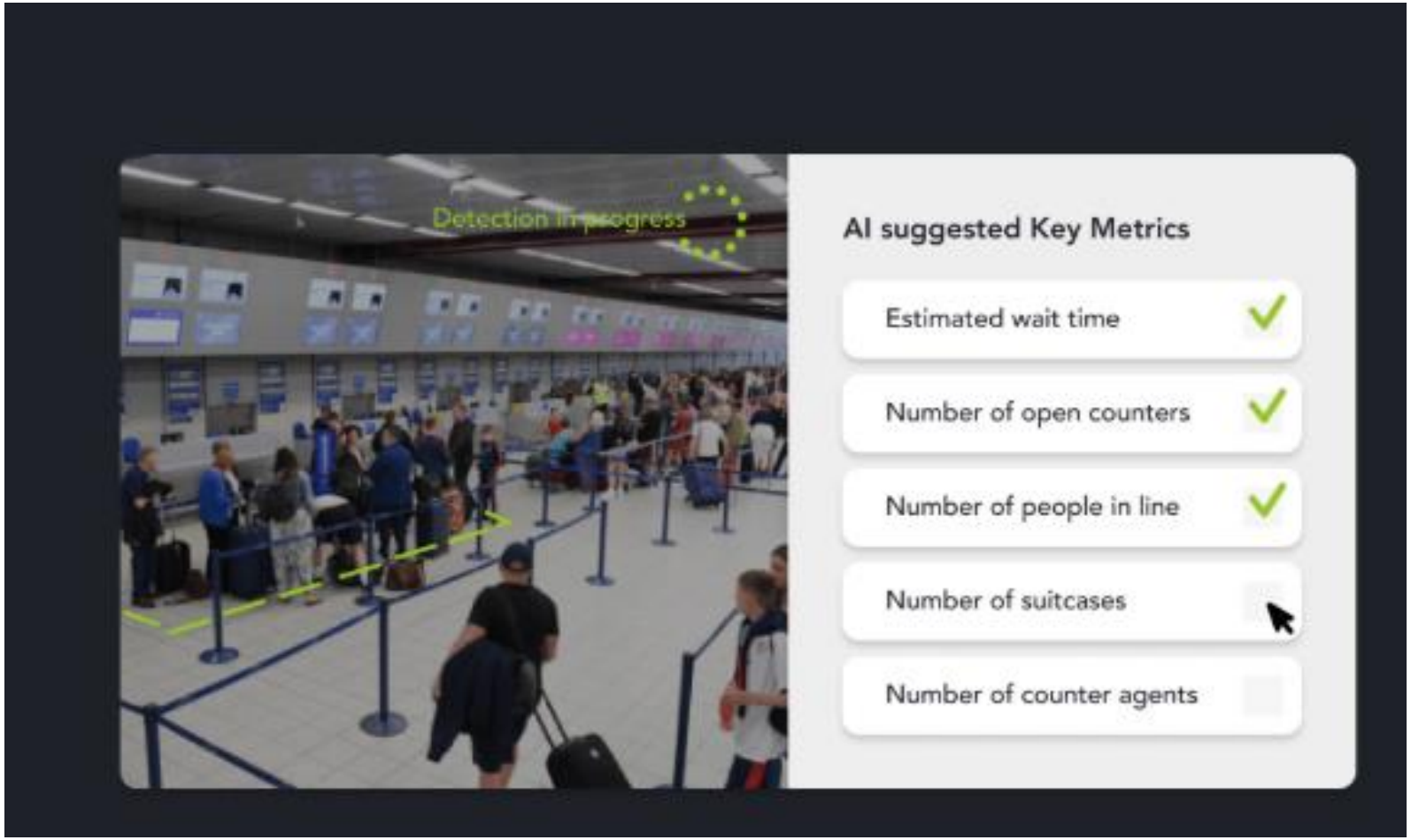
Out-of-Home Advertising

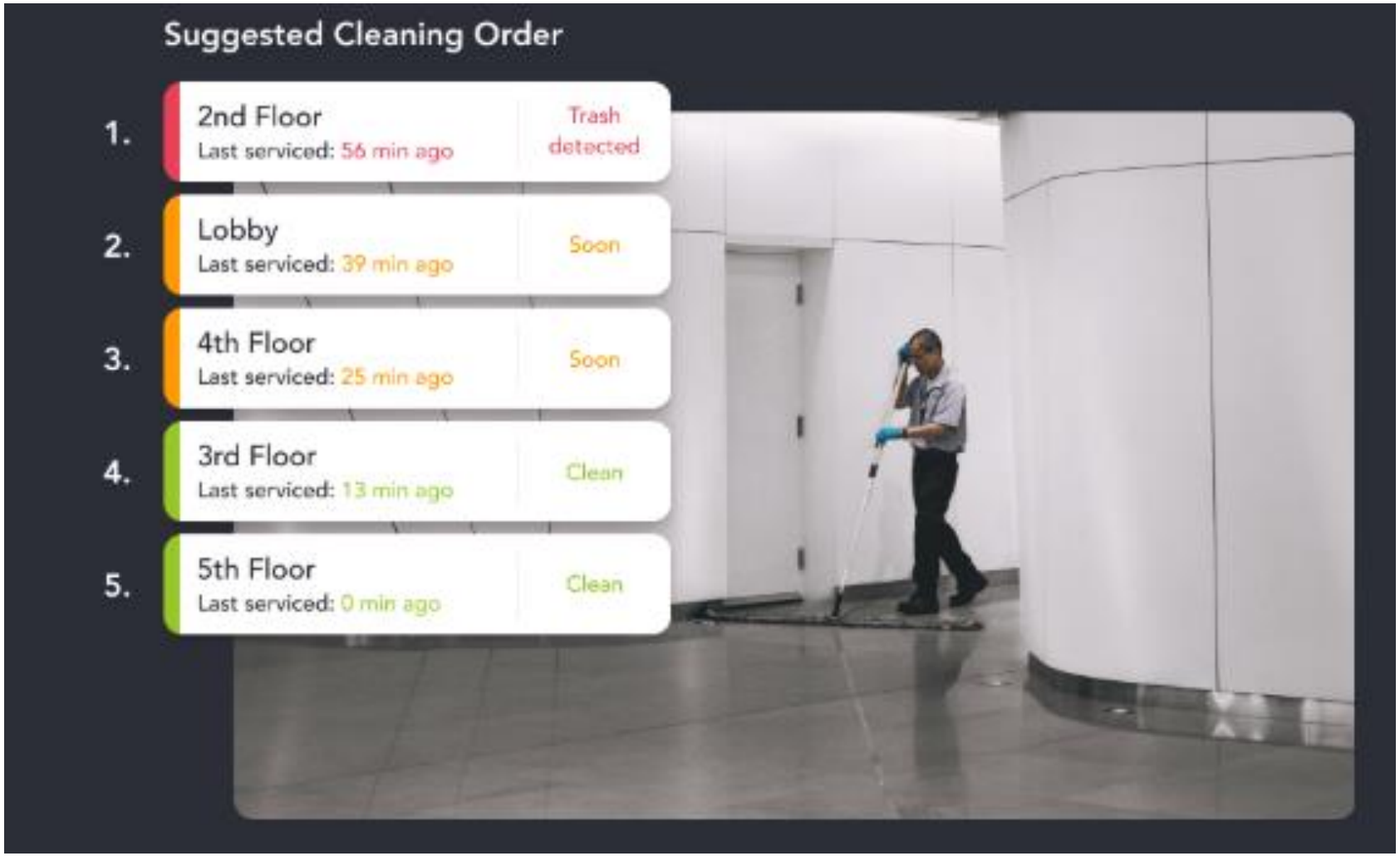
Retail

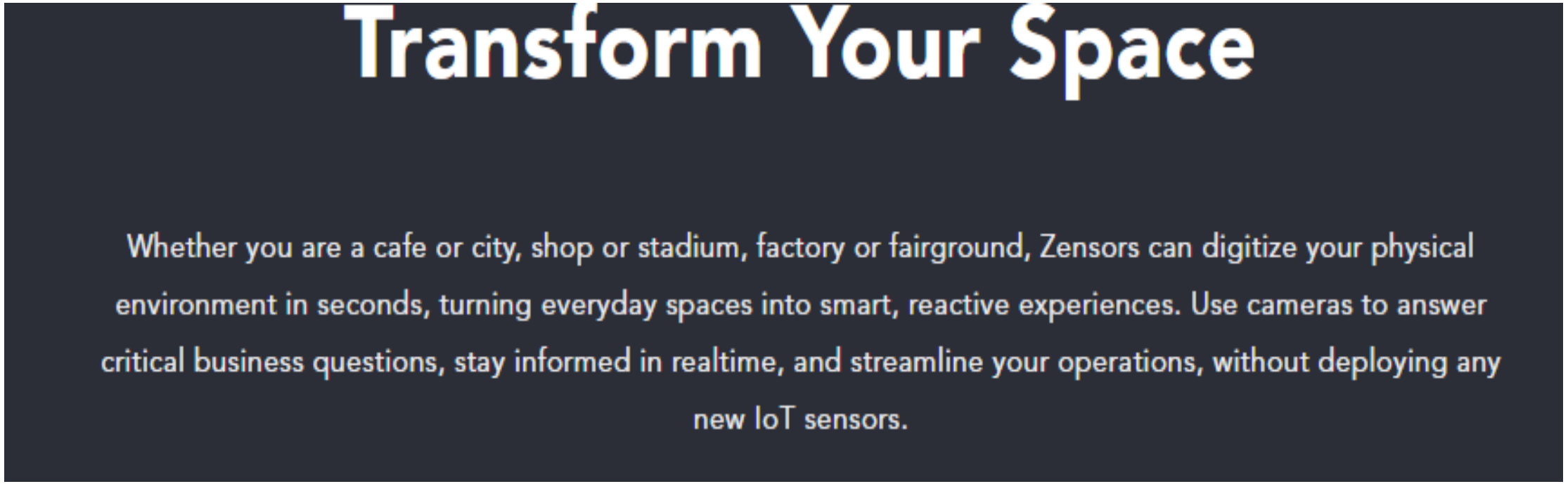
Zensors



- https://www.zensors.com/


Detection in progress
AI suggested Key Metrics
Estimated wait time
Number of open counters
Number of people in line
Number of suitcases
Number of counter agents

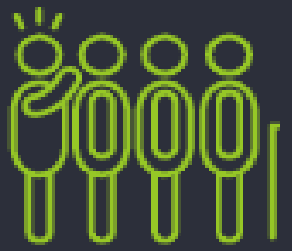

Suggested Cleaning Order
1.
2nd Floor
Last serviced: 56 min ago
Trash detected
2.
Lobby
Last serviced: 39 min ago
Soon
3.
4th Floor
Last serviced: 25 min ago
Soon
4.
3rd Floor
Last serviced: 13 min ago
Clean
5.
5th Floor
Last serviced: 0 min ago
Clean



- TSA - [Travel | Transportation Security Administration - TSA]

Prevent Under/Overstaffing

Zensors observes customer occupancy and helps you automatically predict an optimial schedule for your staff. This prevents overstaffing during lean hours.



Reduce Line Wait Times

AI-powered checkpoint and line management reduces average wait times by up to 7 minutes, reducing customer stress and drop-off.

Windows Arduino Libraries:

- At the **2015 Build developer** conference, Microsoft announced two new software libraries that essentially allow Windows phones (or any hardware running Windows 10) to act as **Arduino compatible development boards.**
- **Windows Virtual Shield for Arduino** lets any Windows device to connect wirelessly to an Arduino board.
- That gives the **Arduino access to all of the hardware in the phone**, from gyroscope to touch screen, just as if those components were hard-wired through an Arduino "shield" module.

- Windows Remote Arduino runs the equation backwards, allowing a Windows application to control and draw on the components of an Arduino device.
- With the release of the libraries, **Windows 10 became the first operating system to join the Arduino Certified program** by making it easy to add an entire Smartphone's worth of hardware components to any Arduino project.

IoT network solutions

- Bluetooth low energy (BLE)
- Light-Fidelity (Li-Fi)
- Near-field communication (NFC)
- QR codes and barcodes
- Radio-frequency identification (RFID)
- Thread

Bluetooth low energy (BLE)

- **Short-range communications** technology
- Bluetooth, which has become very important in computing and many **consumer product markets**.
- The new **Bluetooth Low-Energy (BLE) or Bluetooth** Smart it offers a similar range to Bluetooth it has been designed to take up significantly **reduced power** consumption.
- **Smart/BLE is not really designed for file transfer** and is more suitable for small **chunks of data**

- Bluetooth Smart features incorporate the Bluetooth Core Specification. version 4.2 via its Internet Protocol Support Profile will allow Bluetooth Smart sensors to access the **Internet directly via 6LoWPAN connectivity.**
- This IP connectivity makes it possible to use existing **IP infrastructure to manage Bluetooth Smart 'edge' devices.**

Standard: Bluetooth 4.2 core specification

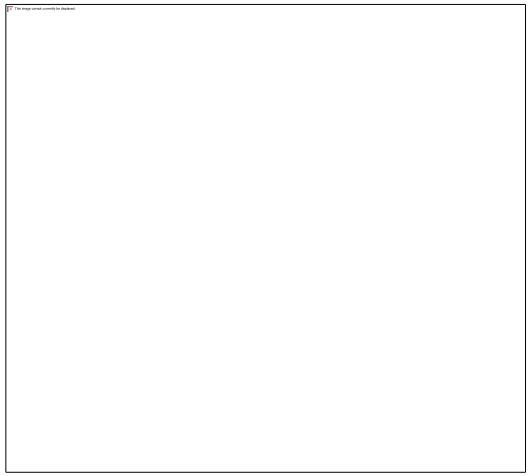
Frequency: 2.4GHz (ISM)

Range: 50-150m (Smart/BLE)

Data Rates: 1Mbps (Smart/BLE)

Light-Fidelity (Li-Fi)

- Wireless communication technology similar to the Wi-Fi standard, but uses visible light communication for increased bandwidth.



Near-field communication (NFC)

- Communication protocols enabling two electronic devices to communicate within a 4 cm range.
- NFC (Near Field Communication) is a technology that enables simple and safe two-way interactions between electronic devices and especially applicable for smartphones, allowing consumers to perform contactless payment transactions, access digital content and connect electronic devices.

Standard: ISO/IEC 18000-3

Frequency: 13.56MHz (ISM)

Range: 10cm

Data Rates: 100–420kbps

QR codes and barcodes

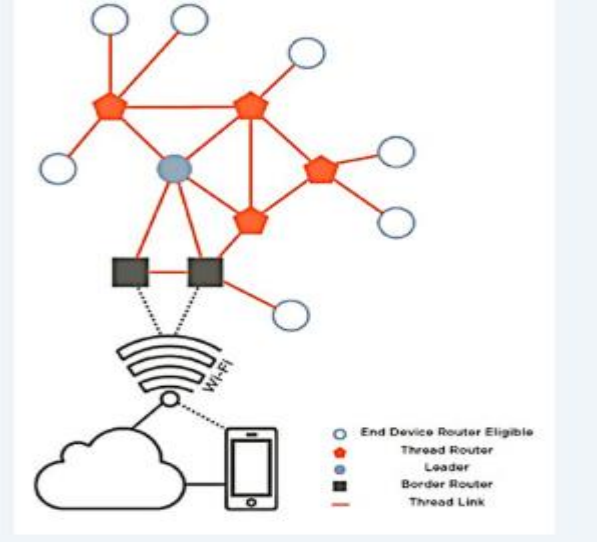
- Machine readable **optical tags** that store information about the item to which they are attached.

Radio-frequency identification (RFID)

- Technology using **electromagnetic fields to read data stored** in tags embedded in other items.

Thread

- Network protocol based on the IEEE 802.15.4 standard, similar to ZigBee, providing IPv6 addressing.
- A very new **IP-based IPv6 networking protocol aimed at the home automation environment is called as 'Thread'**.
- Thread supports a mesh network using IEEE802.15.4 radio transceivers and is capable of handling **up to 250 nodes with high levels of authentication and encryption.**



Standard: Thread, based on IEEE802.15.4 and 6LoWPAN

Frequency: 2.4GHz (ISM)

Range: N/A

Data Rates: N/A

Transport Layer Security (network protocol) TLS

- **Wi-Fi**
- **Wi-Fi Direct**
- **Z-Wave**
- **ZigBee**
- **HaLow**
- **LTE-Advanced**
- **6LoWPAN**
- **Sigfox**

Wi-Fi

Standard: Based on 802.11n (most common usage in homes today)

Frequencies: 2.4GHz and 5GHz bands

Range: Approximately 50m

Data Rates: 600 Mbps maximum, but 150-200Mbps is more typical, depending on channel frequency used and number of antennas (latest 802.11-ac standard should offer 500Mbps to 1Gbps)

- Widely used technology for local area networking based on the **IEEE 802.11 standards**, where devices may communicate through a shared access point.
- WiFi connectivity is often an obvious choice for many developers, especially given the pervasiveness of WiFi within the home environment within LANs.

Wi-Fi Direct

- A Variant of the Wi-Fi standard for peer-to-peer communication, eliminating the need for an access point.
- making it simple and convenient to **print, share, sync, play games, and display content to another device.**
- Wi-Fi Direct devices connect to one another without joining a traditional home, office, or hotspot network.

- https://www.youtube.com/watch?v=je2lWjfpywQ&feature=youtu.be

Z-Wave

Communication protocol providing **short-range, low-latency data transfer at rates and power consumption lower than Wi-Fi**. Used primarily for home automation.

- **Safer, smarter homes start with Z-Wave**

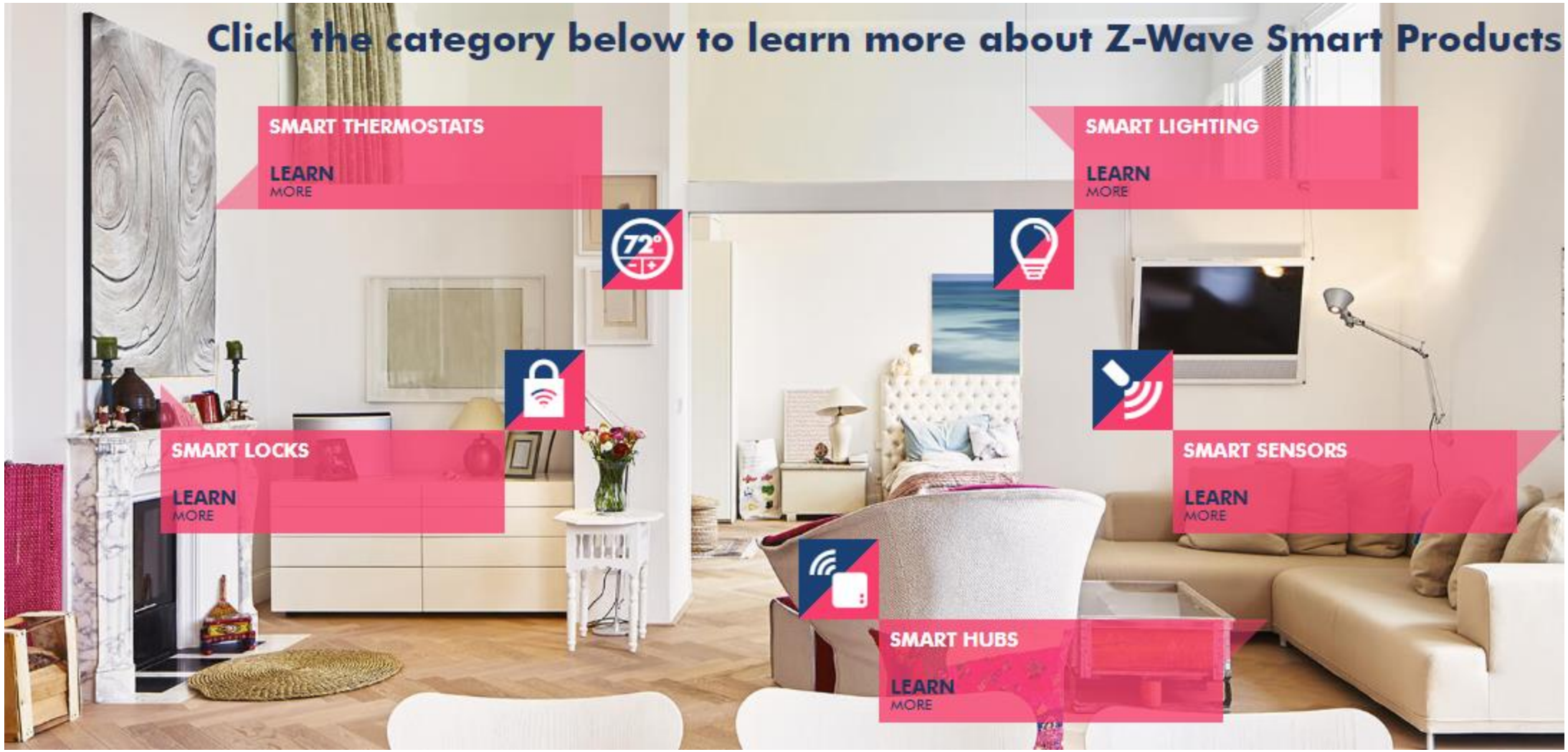
https://www.z-wave.com/

Standard: Z-Wave Alliance ZAD12837 / ITU-T G.9959

Frequency: 900MHz (ISM)

Range: 30m

Data Rates: 9.6/40/100kbit/s


Click the category below to learn more about Z-Wave Smart Products
SMART THERMOSTATS
LEARN
MORE
72°
SMART LIGHTING
LEARN
MORE
SMART LOCKS
LEARN
MORE
SMART SENSORS
LEARN
MORE
SMART HUBS
LEARN
MORE

ZigBee

- Communication protocols for **personal area networking** based on the IEEE 802.15.4 standard, providing low power consumption, low data rate, low cost, and high throughput.
- ZigBee PRO and ZigBee Remote Control (RF4CE), among other available ZigBee

Standard: ZigBee 3.0 based on IEEE802.15.4

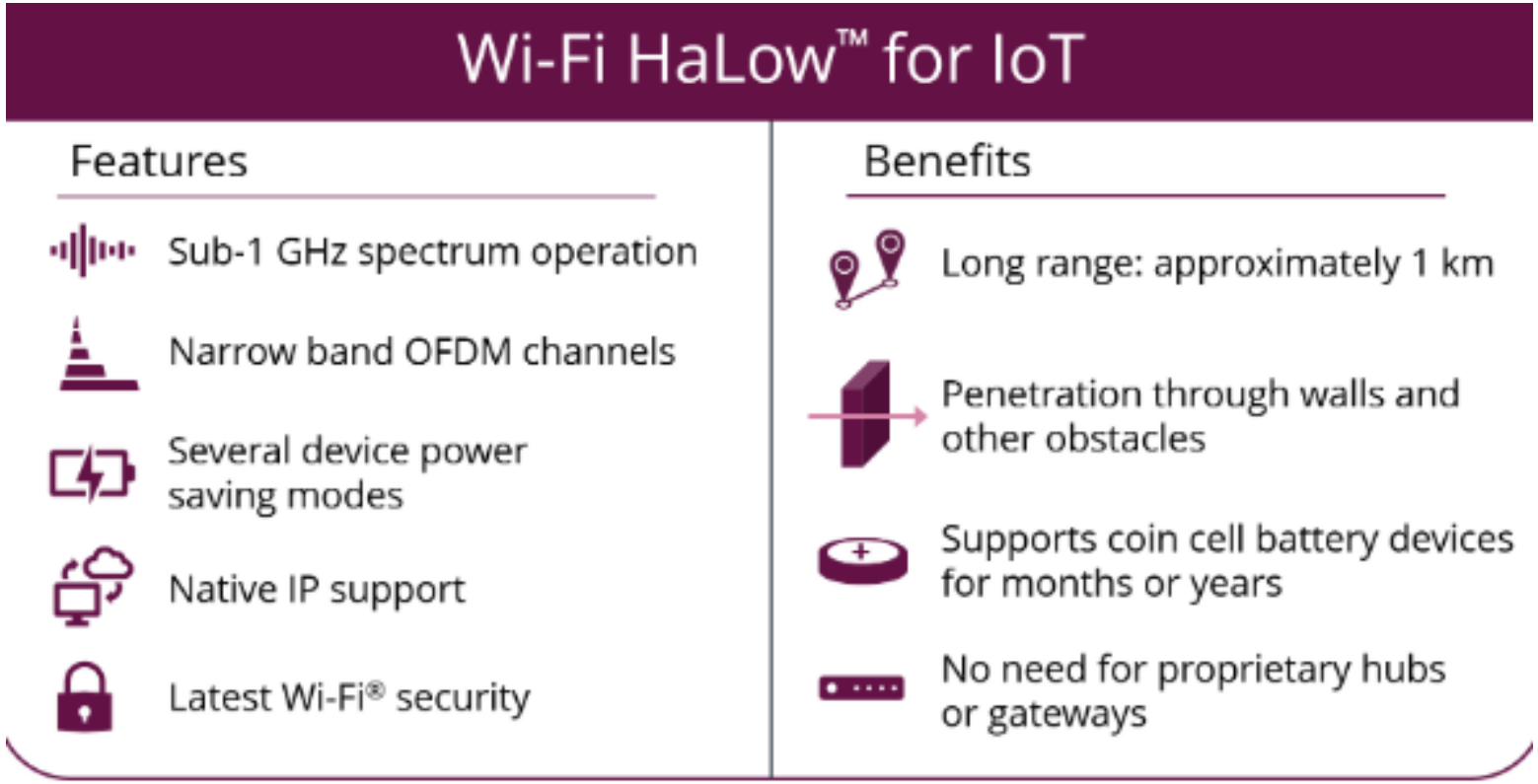
Frequency: 2.4GHz

Range: 10-100m

Data Rates: 250kbps

HaLow

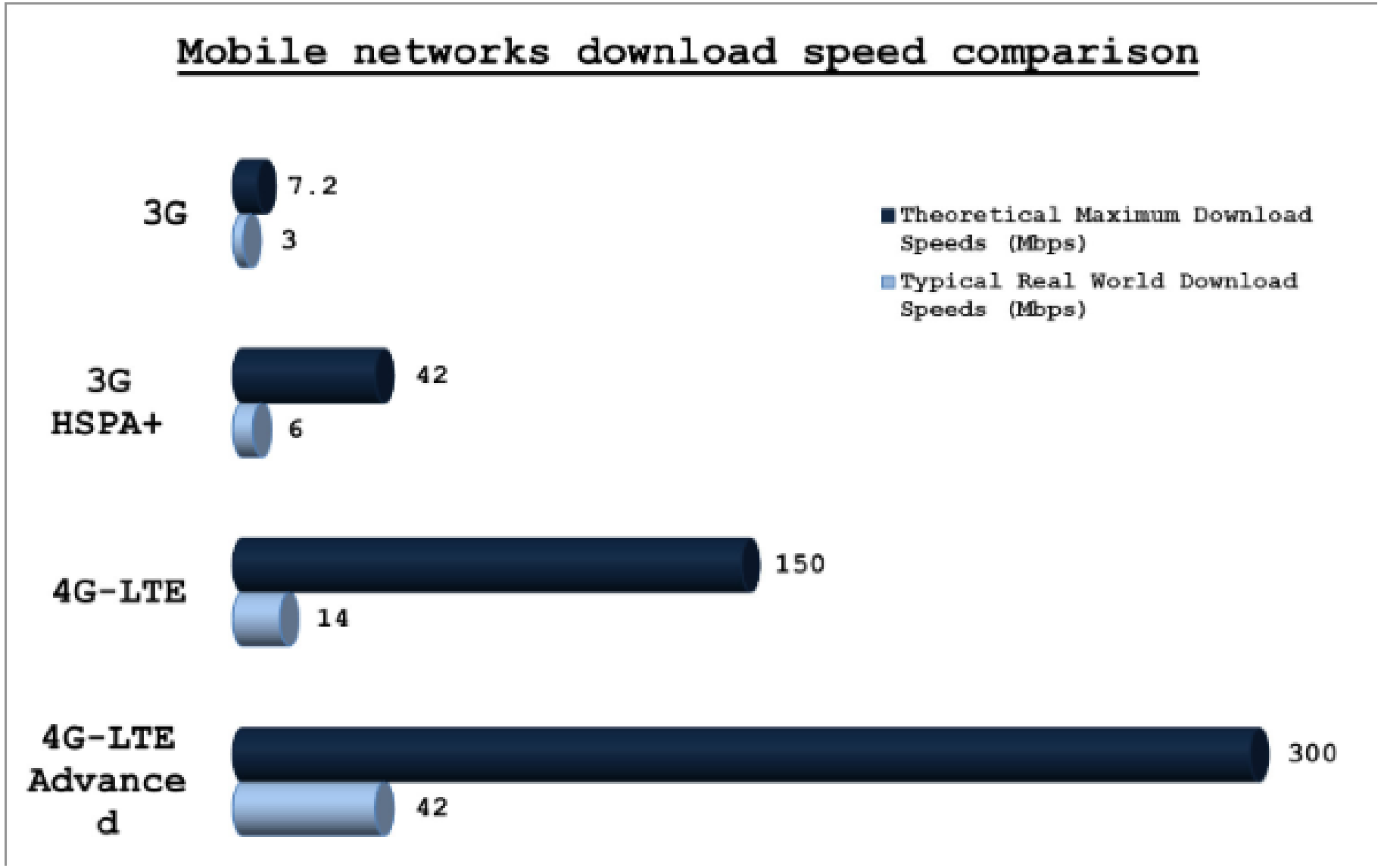
- A Variant of the Wi-Fi standard providing extended range for low-power communication at a lower data rate



LTE-Advanced

- Long-Term Evolution (**LTE**) is a standard for wireless broadband communication for mobile devices and data terminals, based on the GSM/EDGE and UMTS/HSPA technologies.

- High-speed communication specification for mobile networks. Provides enhancements to the LTE standard with extended coverage, higher throughput, and lower latency.


Mobile networks download speed comparison
3G
7.2
3
3G HSPA+
42
6
4G-LTE
150
14
4G-LTE Advanced
300
42
Theoretical Maximum Download Speeds (Mbps)
Typical Real World Download Speeds (Mbps)

6LoWPAN

Standard: RFC6282

Frequency: Adapted and used over a variety of other networking media including Bluetooth Smart (2.4GHz) or ZigBee or low-power RF (sub-1GHz.

Range: N/A

Data Rates: N/A

- A key IP (Internet Protocol)-based technology is 6LoWPAN (IPv6 Low-power Wireless Personal Area Network).

Advantages of 6LoWPAN:

Uses Open IP Standards

Offers End-To-End IP Addressable Nodes

Offers Self-Healing, Robust and Scalable Mesh Routing

Leaf Nodes Can Sleep For a Long Duration of Time

Offers Thorough Support For The PHY Layer

It is a Standard: RFC6282

6LoWPAN Application Areas

- **Automation:** There are enormous opportunities for 6LoWPAN to be used in many different areas of automation.
- **Industrial monitoring:** Industrial plants and automated factories provide a great opportunity for 6LoWPAN.
- **Smart Grid:** Smart grids enable smart meters and other devices to build a micro mesh network.
- **Smart Home:** By connecting your home IoT devices using IPv6, it is possible to gain distinct advantages over other IoT systems.

Sigfox

Standard: Sigfox

Frequency: 900MHz

Range: 30-50km (rural environments), 3-10km (urban environments)

Data Rates: 10-1000bps

LOW POWER
Unique connectivity solution provides the lowest energy-consumption device-to-cloud.
By simplifying communications, enable unbeatable low energy consumption.

LOW COST
With its simple approach to connectivity, Sigfox provides ultra price-competitive connectivity subscriptions and even more importantly, enables extremely simple and cost-efficient silicon modules.

https://www.sigfox.com/en

COMPLEMENTARY TECHNOLOGY
Sigfox is compatible with Bluetooth, GPS 2G/3G/4G and Wifi. By combining other connectivity solutions with Sigfox, business cases and user experience can be drastically improved.

Neul

- Similar to Sigfox in concept and operate in the sub-1GHz band, 'Neul' leverages very small slices of the TV White Space spectrum to deliver high scalability, high coverage, low power and low-cost wireless networks.

Standard: Neul

Frequency: 900MHz (ISM), 458MHz (UK), 470-790MHz (White Space)

Range: 10km

Data Rates: Few bps up to 100kbps

LoRaWAN

Similar in some respects to Sigfox and Neul, LoRaWAN targets wide-area network (WAN) applications and is designed to provide low-power WANs with features specifically needed to support low-cost mobile secure bi-directional communication in IoT, M2M, smart city and industrial applications. Optimized for low-power consumption and supporting large networks with millions and millions of devices, data rates range from 0.3 kbps to 50 kbps.

Standard: LoRaWAN

Frequency: Various

Range: 2-5km (urban environment), 15km (suburban environment)

Data Rates: 0.3-50 kbps.

- Following videos in the URL can be referred for how IoT works? https://www.youtube.com/watch?v=o7VXyolenvU – IoT explained easily