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Overview and background of internet of things

This slide provides a brief introduction to the Internet of Things. It also provides a brief history of the evolution of IoT devices and facts related to the number of IoT-connected devices, expected growth, etc.

Internet of things (IoT)

- Network of physical objects, "things" that are linked with sensors, software, and other devices to connect and transfer data with other devices and systems over the internet without any human interaction
- These "things" can be anything from ordinary household objects such as kitchen devices, speakers, cars, baby monitors to a sophisticated industrial tool/application
- Add text here

Key statistics

Over 13 Bn IOT devices are connected worldwide

IoT devices have surpassed non-IoT devices in 2020

By 2030, this figure is expected to reach to 25.4 Bn

History

- **1990** — First IoT device created by John romkey- toaster controlled by his computer
- **2000** — LG introduced first connected refrigerator @$20,000 for its customers
- **2008** — Zurich, Switzerland held the world's first IoT conference
- **2010** — Tony fadell founds nest, marker of smart thermostat
- **2013** — Term "Internet of things" added to the oxford dictionary
- **2014** — Amazon introduces the Echo speaker, a new way to control the smart home
- **2016** — The mirai botnet infects over 600,000 IoT devices with malware
- **2020** — IoT connected devices exceeds by 20 Bn in numbers

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Current challenges of internet of things

This slide presents the various challenges that the adoption of IoT might face. It includes challenges such as privacy, security, software development, Ai and ML infusion, standard, compatibility, and changing regulations.

Privacy

lot devices can collect and transmit a lot of personal data, which could be used for malicious purposes

Security

lot devices are often vulnerable to hacking, which could allow attackers to steal data, disrupt operations, or even cause physical damage

Software development

There is a shortage of skilled iot developers, which can slow down the development and deployment of iot projects

AI & ML infusion

It is difficult to infuse AI and ML into iot devices due to their limited computing power

Standards

There is no single standard for IoT, which can make it difficult to connect and manage devices

Compatibility

IoT devices can use different communication protocols and cloud platforms, which can make it difficult to get them to work together

Regulation

There are few IoT-specific data regulation policies in place, which could lead to legal challenges

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Emerging trends and future applications of IoT

This slide presents the emerging trends and future applications of IoT. It incorporates edge computing in IoT, AI, and ML in IoT data analysis, IoT in smart cities, and Blockchain technology for security and privacy.

Edge computing in IoT

- Processing data on device to Reduce latency, improving reliability, and enhancing privacy and security
- More IoT devices with built-in edge computing capabilities
- Gartner predicts that by 2025, 75% of enterprise-generated data will be created and processed at the edge

01

02

AI and ML in IoT data analysis

- Using advanced analytics to gain valuable insights from IoT data
- Healthcare industry example: AI-powered wearables and devices for health monitoring
- Global IoT and AI market expected to reach $1742.8 Bn by 2025

IoT in smart cities for infrastructure optimization

- Connecting devices and sensors for traffic management, environmental monitoring, and waste management
- Improving infrastructure and quality of life for residents
- Global smart city market expected to reach $1024.4 Bn by 2027

03

04

Blockchain technology for security and privacy in IoT

- Storing IoT data in a decentralized, tamper-proof ledger using blockchain
- Enhancing security and protecting user privacy
- Global blockchain IoT market expected to reach $469.4 Bn by 2025

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Use case of various IoT devices in smart home applications

This slide highlights the various applications of IoT usage in smart homes and the devices used. It includes applications such as temperature control, electricity, bathroom, kitchen, garden, security system, door and window, and home routine.

Applications	Features	Devices
01 Temperature control	o Allow automatic temperature control o Enable temperature based on preferences o Add text here	o Thermocouples o Resistance temperature detectors (RTD)
02 Electricity	o Enable automatic turn on/ turn off of appliances o Perform action such as making coffee, cleaning floors o Add text here	o Smart TV o Smart AC o Vacuum cleaner o Coffee machines
03 Bathroom	o Enable sensors to detect movement and automatically control water switches o Adjust water temperature and conserve water	o Smart toilets o Smart showers o Smart leak detectors o Smart mirrors
04 Kitchen	o Allow cooking easier and safer o Monitoring smoke and carbon monoxide levels o Track availability of foods and nutritional values	o Smart refrigerators o Smart grill thermometer o Automatic coffee maker o Precision cooker
05 Garden	o Monitor soils condition such as moisture level, nutrients o Control watering system to prevent water waste o Monitor weather conditions required for plants growth	o Smart irrigation controller o Smart watering controller o Garden Sensor o Sprinkler controller

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Major applications of IoT devices for smart home security

This slide showcases the primary application of IoT devices and their features for smart home security. It incorporates IoT devices such as smart cameras, biometric locks, video door entry systems, fire or smoke sensors, and motion sensors.

Application	Features	Devices
01 Smart cameras	o Act as digital eyes of the house and helps the owner to observe all activity in real-time both inside and outside of the premises o Door cameras can do the surveillance footage for monitoring areas around the front and rear entrances	o Nest cam indoor camera o Nest cam outdoor camera o Add text here o Add text here
02 Biometric locks	o IoT-based smart security locks operate fingerprints or facial recognition to grant entrance to the user o Provide robust security to any premises while eliminating the need for keys	o ML 100 o TL 800 o TL 300Z o Add text here
03 Video door entry system	o Enable user voice and face recognition for access control in-home o Compatible with Siri, Amazon Alexa, or google home o Allows owner to monitor the house remotely and even speak to visitors via video calls	o Ring Pro smart video doorbell o Sky Bell smart video doorbell o Add text here o Add text here
04 Fire/smoke sensors	o Devices fitted with carbon monoxide sensors, which send alerts when they detect high levels of dangerous gas in the house o Initiate a call to fire department or automatically turn on sprinklers	o Lora WAN smoke detection sensor o Nest protect o Add text here o Add text here
05 Motion sensors	o Trigger alarms to inform the owner about the activity happening in or around the house o Systems report suspicious activity by recording and analyzing vibrations and inputs in 2D and 3D	o Lora wan motion detection sensor o Desk presence Lora sensor o Add text here o Add text here

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Steps to craft industrial IoT based predictive maintenance

This slide showcases the steps to develop industrial IoT-based predictive maintenance. It incorporates stages such as determining predictive maintenance assets, prioritizing tasks, and identifying the right software.

Determine predictive maintenance assets

- Evaluate the downtime and financial impact of equipment before choosing IoT-based predictive maintenance
- Add text here

01

Prioritize task

- Prioritize assets with past downtime occurrences and financial losses
- Start with the most critical assets
- Add text here

02

Identify right software

- Browse predictive maintenance and computerized maintenance management system (CMMS) market categories
- Look through the available options and narrow down choices
- Evaluate the reviews and select the best predictive maintenance tool to fulfil needs
- Add text here

03

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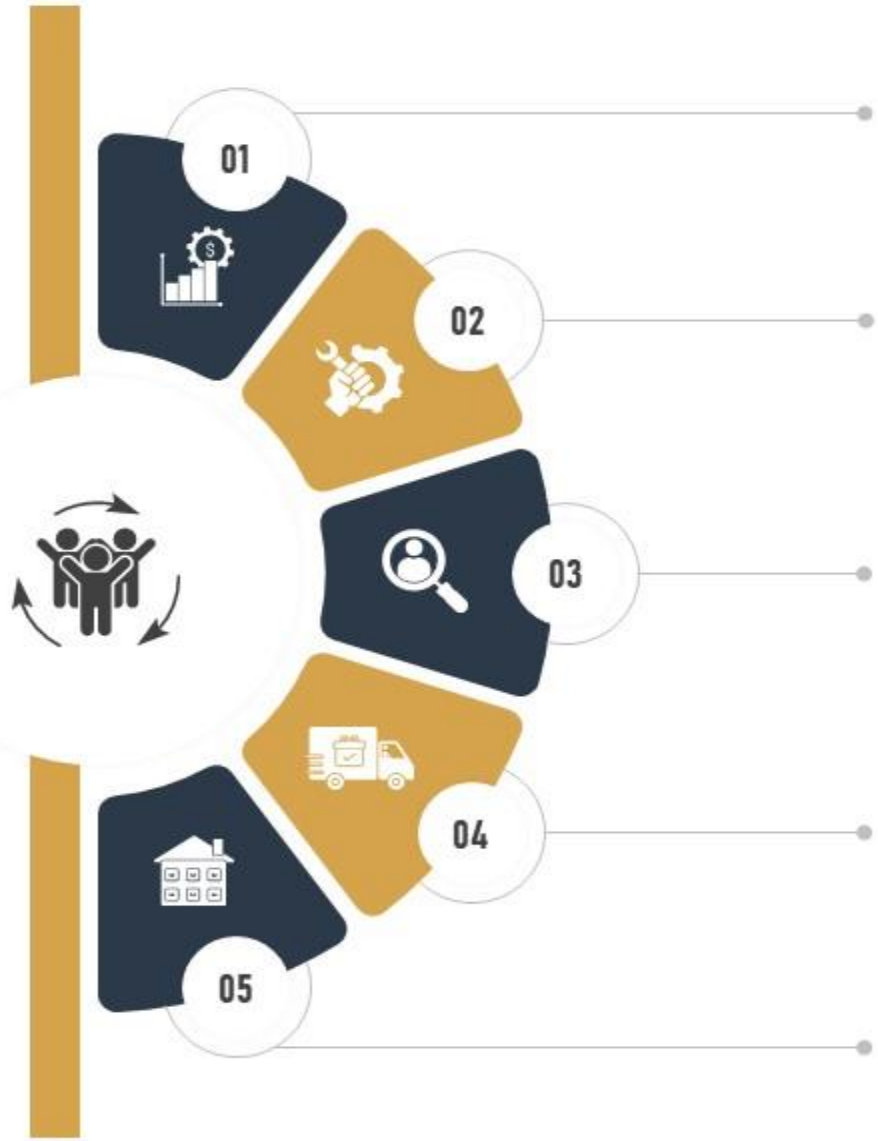
Real life examples of IoT based asset management

Mentioned slide covers some of the real-life examples of IoT-based asset management techniques. It includes applications such as warehouse management, tools lifecycle, tracking assets, reporting, and decreasing human dependency.



Reducing human dependency

- Decreasing reliance on human power
- Improve device performance
- Add text here

Tool lifecycle

- Optimize repair and replacement
- Increase asset lifecycle
- Add text here

Tracking assets

- Location data automatically
- Geofencing approach
- Using GPS to track assets

Reporting

- Reporting automation
- Monitoring asset flow
- Add text here

Warehouse management

- Automatic update of warehouse inventory and stock
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