

# Edge Computing Internet of Things Cybersecurity



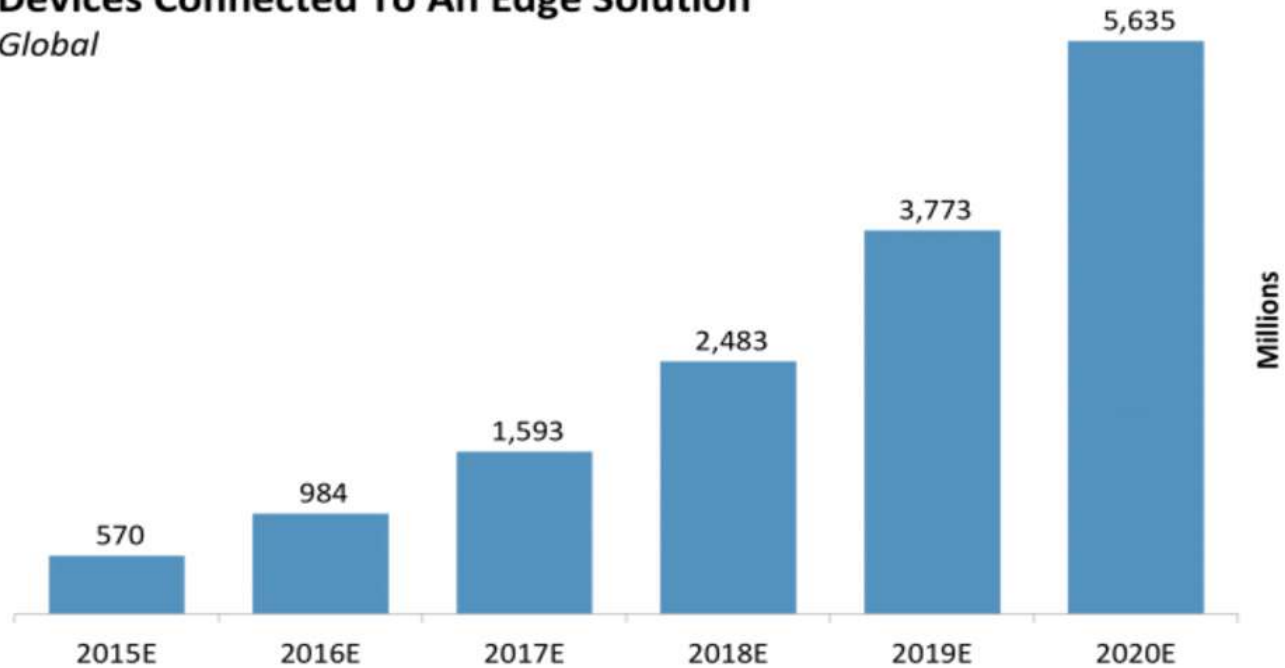
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# Internet of Everything

## Estimated Number Of Enterprise & Government IoT Devices Connected To An Edge Solution

Global



Source: BI Intelligence estimates, 2016

BI INTELLIGENCE

According to Cisco, all of the people and things connected to the internet will generate 507.5 zettabytes (1 zettabyte = 1 trillion gigabytes) of data by 2019



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# Edge Computing Layers

- Data sources
  - Sensors, Databases, Event sources
  - Social Media, Machine and Equipment Logs,
  - other unstructured Big Data
- Intelligence
  - Machine Learning Algorithms (Cloud)
  - Neural Networks
  - Machine Learning Modules (Edge)
  - Artificial Intelligence
- Innovative techno and security
  - Big Data, Cloud Computing
  - Interface for Smart Things
  - UI/UX Functionality
  - Scalability is a good feature
  - Excellent security and compliance (GDPR in Europe)



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# Data Sources

Computing is becoming increasingly data-driven.

**Data source tier** = anything that can generate data

- \* TVs and laptops
- \* Smartphones, industrial equipment, CRM, SCM, ERP, everything is a source of data
- \* machine logs,
- \* click streams,
- \* social media feeds,
- \* RDBMS,
- \* unstructured and structured data.



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# Intelligence Layer

- Neural Networks and Artificial Intelligence : fantastic function opportunities.
- Innovative solutions around GPUs, FPGA, and custom chips: creating trained Machine Learning models based on large datasets and complex algorithms
- IoT solutions: need communications and cloud infrastructure.
- Operational and Actionable Insights : ground of actions based on the intelligence
- High security: “MUST HAVE” for IoT solutions.
- Both in premise and cloud solutions should guarantee house security



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# Internet of Trusted Things

Smart Watches, Smart Wearables, Smart TV, Smart House, Smart Safety, Smart Security.

- \* Internet of Smart Things,
- \* Internet of Hacked Things
- \* Internet of Trusted Things

Internet of Things technologies can be used for healthcare, productivity, smart solutions, house automation.



[https://en.wikipedia.org/wiki/Internet\\_of\\_things](https://en.wikipedia.org/wiki/Internet_of_things)

**But Internet of Things technologies can also be used for network attacks!**

It confirms the need to protect at all levels including user devices, network infrastructure, data security, VPN, cloud resources.



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# Security principles for systems with IoT devices

IoT devices can be used not only for botnet attacks but as smart devices for monitoring and system audit

What is the difference and what are the prospects?

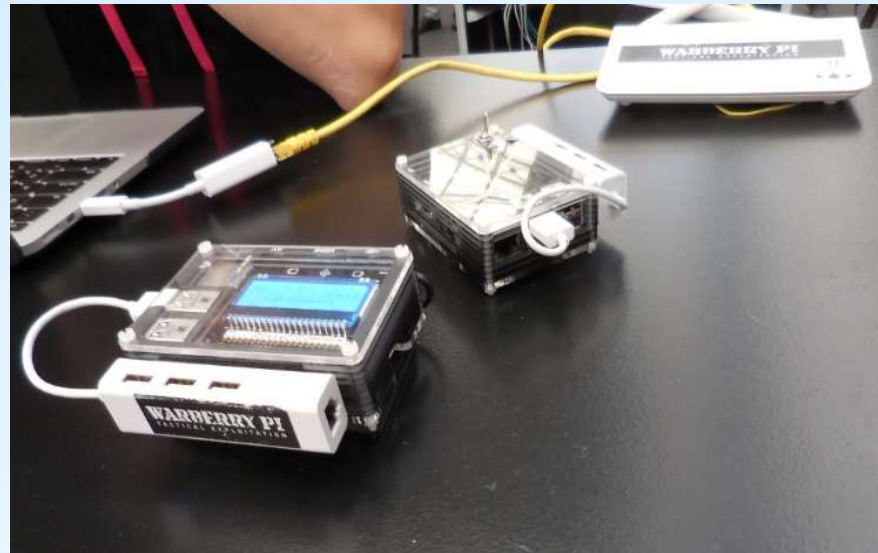
- \* Maintaining secure configuration of information infrastructure and IoT devices
- \* Protection against malicious actions
- \* Regular audits
- \* Physical protection of IoT infrastructure
- \* Protection of credentials in the cloud
- \* It is useful to periodically audit IoT security



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## Network infrastructure for using IoT devices



### Difference and prospects of different IoT devices

- \* Warberry PI built for Pentests can be used for traffic monitoring,
- \* IoT devices are subjected to zero-day threats and require timely updates like the standard workstations



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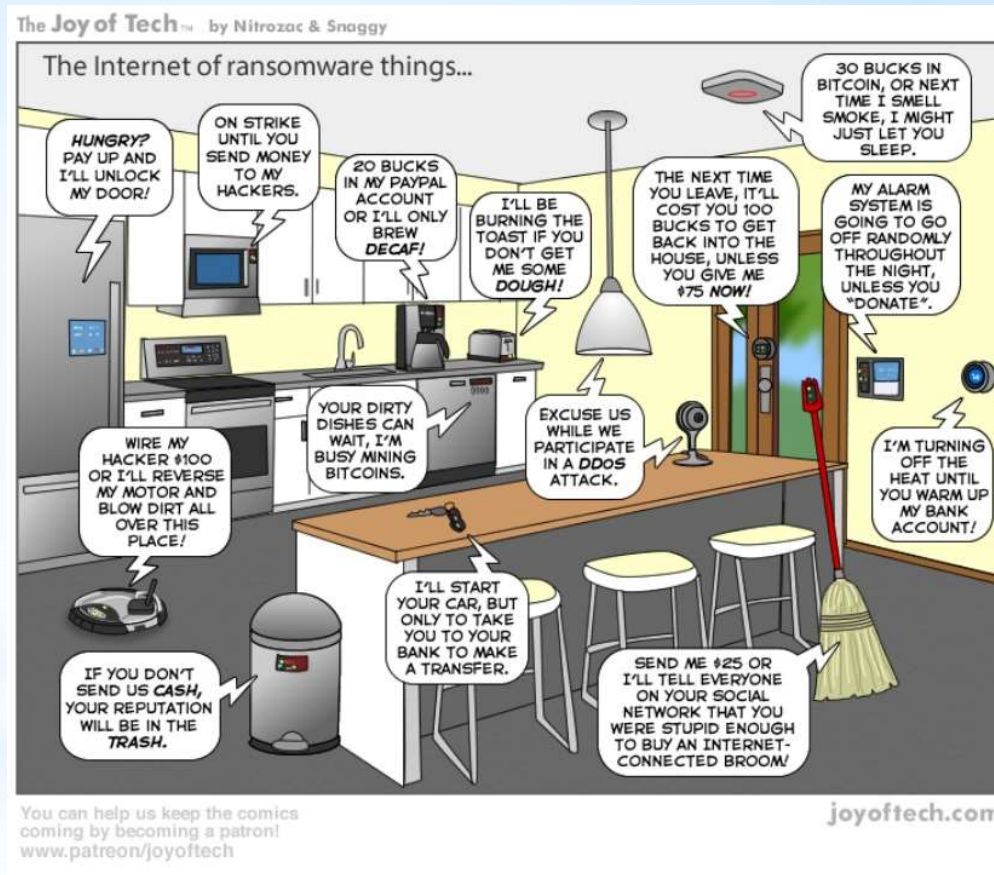


# Customer Environment and Home Things

- \* Notebook,
- \* Smart wearables,
- \* Smartphone,
- \* Smartwatches

## Mobile Internet

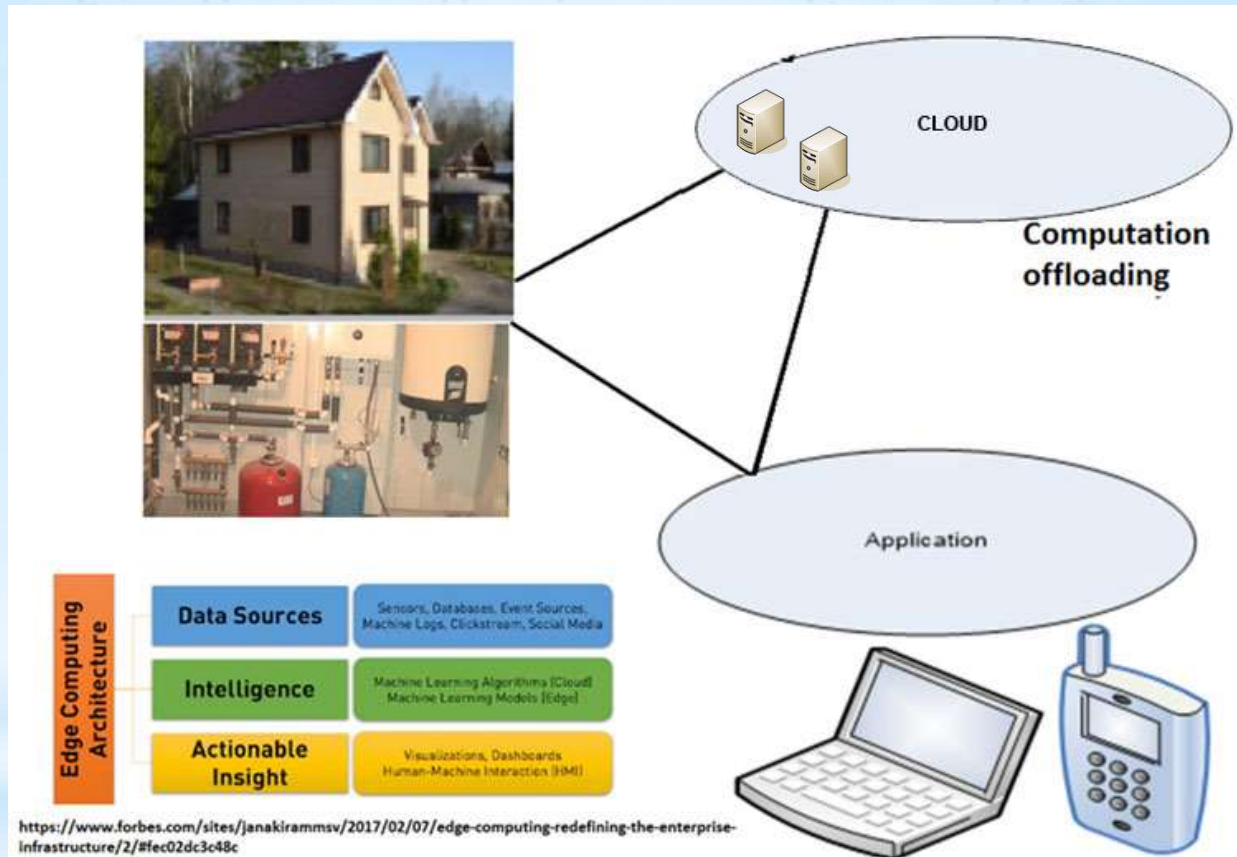
- \* ADSL
- \* Wifi
- \* GPRS
- \* LTE



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# Smarthouse with edge computing and IoT



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# Healthcare IoT

Health IT (health information technology): IT involving the design, development, creation. Automated and interoperable healthcare information systems are expected to improve medical care, lower costs, increase efficiency, reduce error and improve patient satisfaction, while also optimizing reimbursement for ambulatory and inpatient healthcare providers

High-performing and convenient care coordination tool, user-friendly, integrated with EHRs and other external data sources, offering real-time communication capabilities is useful for clinics

Applications in healthcare include

- \* remote monitoring
- \* smart sensors
- \* medical device integration
- \* An electronic health record (EHR) is an official health record for an individual that is shared among multiple facilities and agencies\*

\*<http://searchhealthit.techtarget.com/>



Mini-computer on Raspberry Pi



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