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The rise and risks of IoT!

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BSI: Supporting industry, globally

80,000 clients

172 countries

3 regional hubs

75 offices worldwide

51% of Fortune 500

75% of FTSE 100

68% of Nikkei Index

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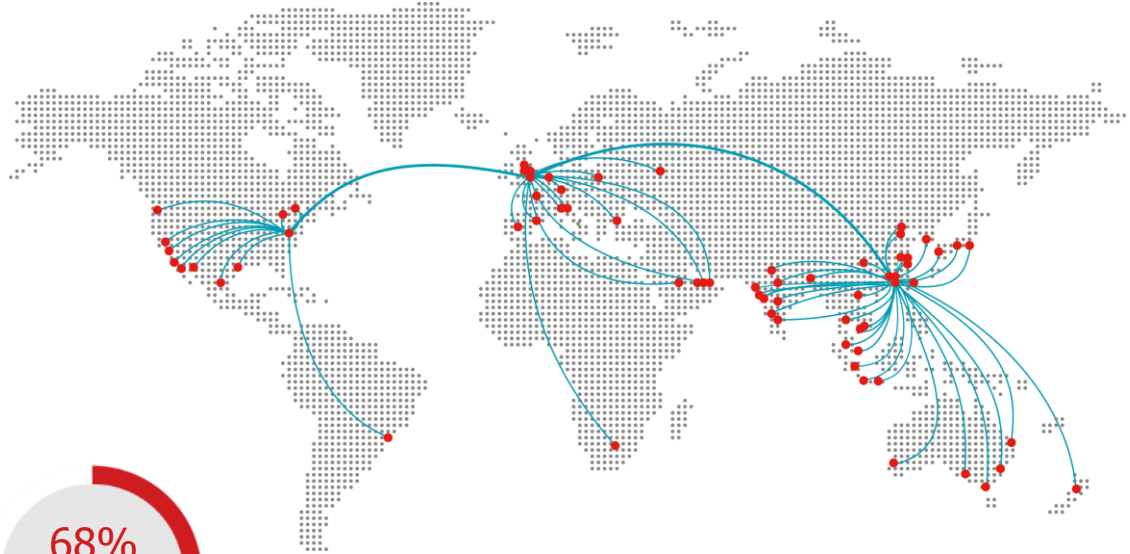
BSI Cyber Security

Cyber Security and Information Resilience (CSIR)

- Consulting
  - Strategy, security testing, support
- Technical Solutions
  - Managed services
- Research
  - Horizon scanning, digital forensics
- Training
  - Wide range of course covering directives, standards and technologies
- CREST-Certified
- CyberEssentials/CyberEssentials+
- **>100 people >£15M Revenue**

3

BSI IoT

IoT Product Certification

- Long history of product certification
- Safety-critical testing
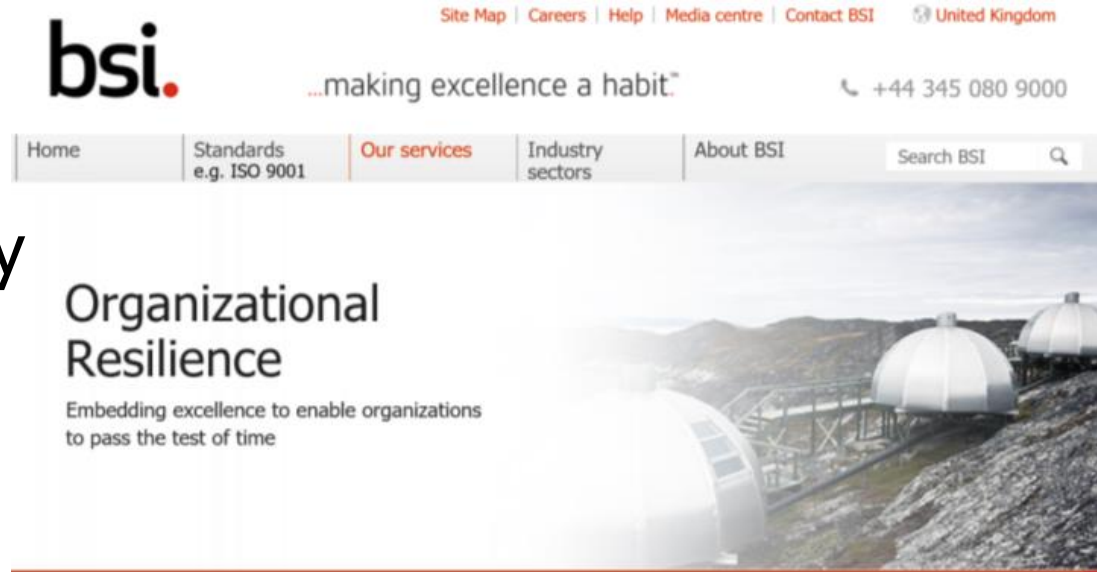- New IoT Lab
    - Hemel Hempstead, London, UK

Combined with Cyber Security

- Unique total solution:
- *Hardware, Firmware, Software*
- *Combines*
    - *Expert cyber skills*
    - *Pragmatic, product risk management*

Why BSI?

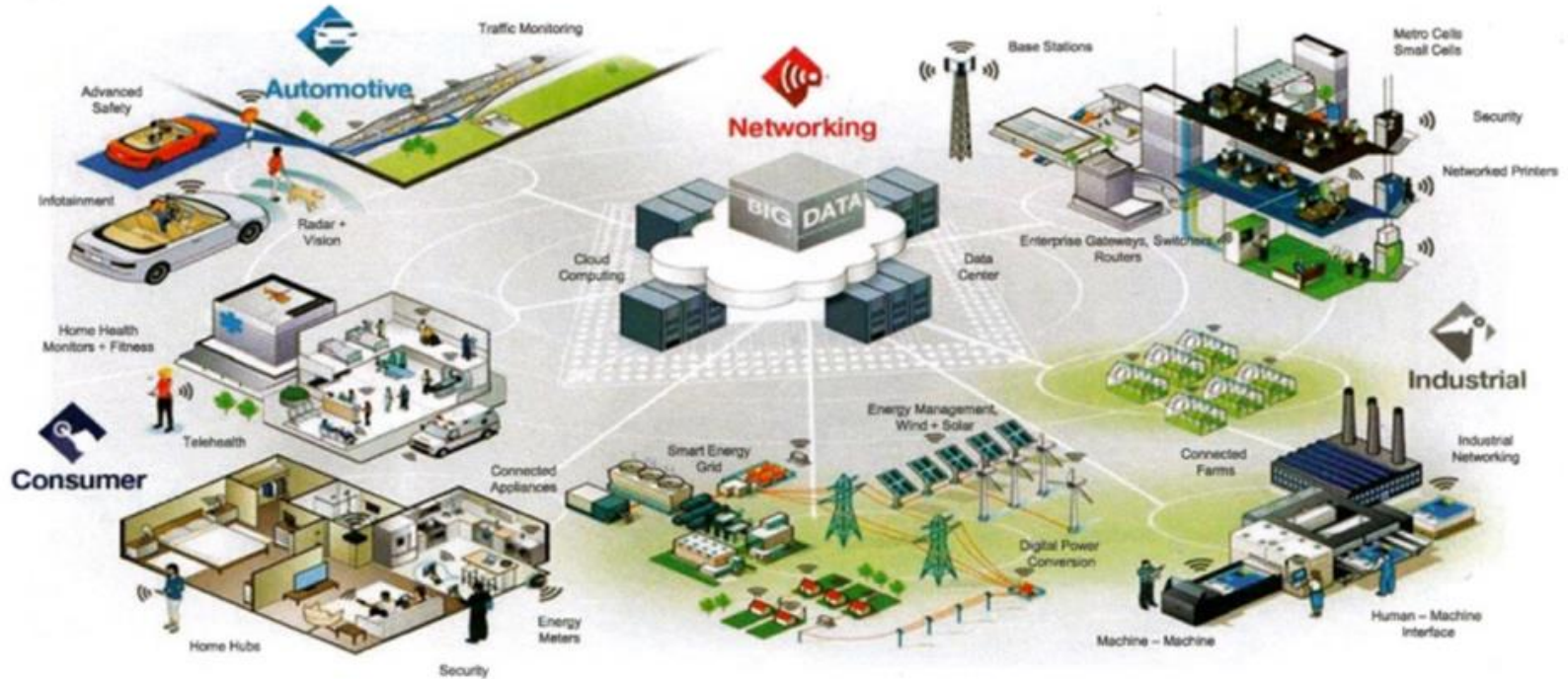- Capturing opportunity

- Minimizing risk

What's the big deal?

IoT – where the digital and physical worlds collide!

Machines that talk to other machines, learn and act without the need for human intervention

The Internet of Things:

- The IoT connects everyday items, including across the built environment, to improve asset efficiency and create new and improved services

$11 trillion per year value from the Internet of Things (IoT) by 2025

65% of CEO's see the IoT as strategically important in digital transformation

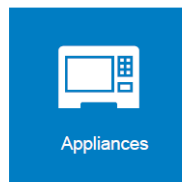8.4 billion connected devices in 2017

$2 trillion revenues in 2017
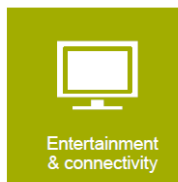
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Smart Homes

Security & control	Appliances	Entertainment & connectivity	Energy & lighting	Health
• Smart blinds or shutters • Alarm system • Motion sensors for doors & windows • Smart detectors • IP camera • Access control (digital keys) • Smart Doorbell • Smoke alarm & air quality sensor	• Smart toothbrush • Smart kettle • Smart coffee maker • Smart air conditioner • Smart refrigerator • Smart washing machine • Robot vacuum cleaner	• Streaming multi room audio • Smart TV • Smart set top box • Smart Tuner/Amplifier/Receivers • Home Plugs • Routers • Repeaters • W-LAN sticks	• Smart thermostat • Energy manager • Smart control radiator • Smart meter (energy meter) • Monitoring of boiler at a distance • Smart lighting (smart lamps) • Smart light control	• Personal scale • Blood pressure monitor • Fitness and activity tracker • Smart Baby monitors • Medication monitor/reminder • Disease activity monitor

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Smart Cities

- IoT technology
  - Sensors
  - Actuators
  - Big data
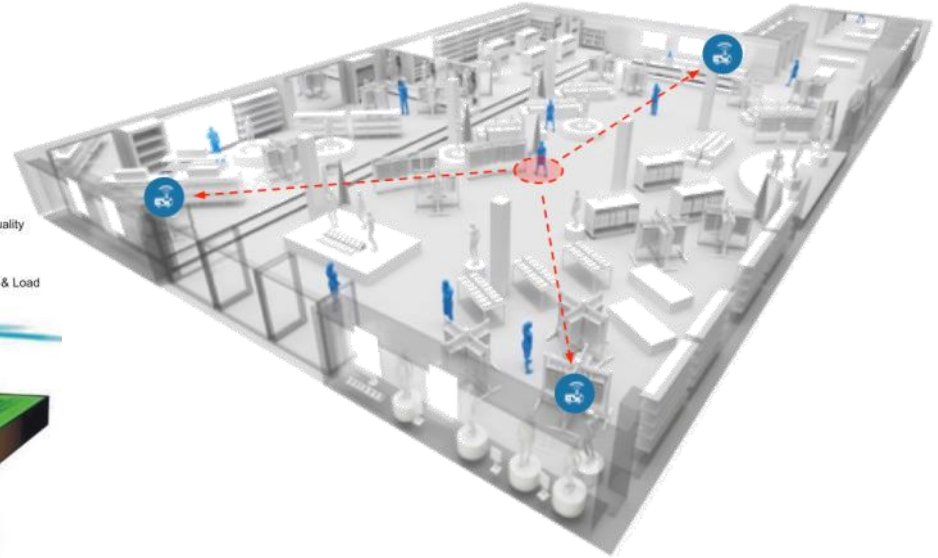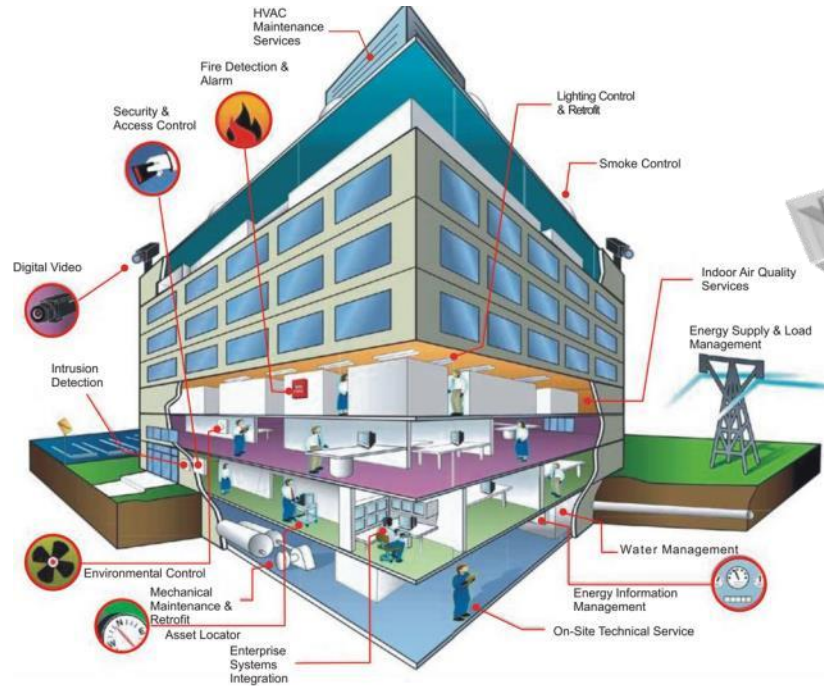- Key enabler for Smart Cities

Energy **Building** **Transportation**

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Smart Buildings

Assets....

People

IoT: What could go wrong?

IoT – why?

It's obvious… isn't it?

- *Embrace it or die?*
- *Current project… doesn't cost much more to add IoT?*

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Why most IoT Projects fail.... **Strategy**

Complex integration?

Not invested enough in logistics?

Lack of skills?

IT/OT 'Silo' mentality?

Use of cheap sensors?

Budget/time overrun?

Thinking IoT is all one industry?

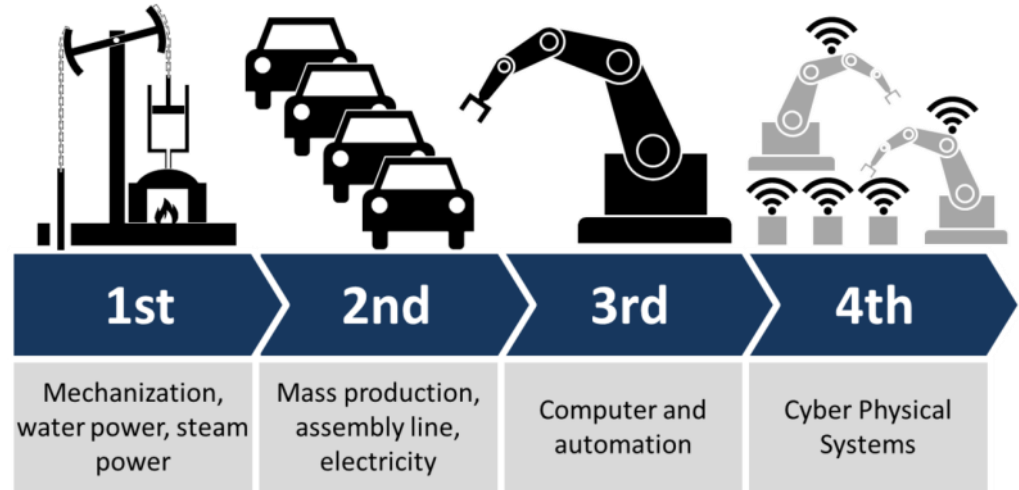Not building a multi-disciplinary team?

Not learning from computing history?

IoT: Smart Factories - Industry 4.0

Industrial IoT (IIoT)

Gained value

- More output
  - Production Performance increase.
  - Optimized preventive maintenance.
- Less costs
  - Stock Cost reduction.
  - Quality costs reduction.
  - Energy costs reduction.
- **More differentiation**
  - **Easy customization**

1st	2nd	3rd	4th
Mechanization, water power, steam power	Mass production, assembly line, electricity	Computer and automation	Cyber Physical Systems

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IoT: Smart Stores - Retail 4.0

Personalized & Seamless Shopping

- **Customer Experience**

- Homogenous, unique, original experience

- Tailored to the individual customer

- Dynamic response to changing demands

  - *Enabled by IoT*

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Customer Experience

For *your* customer

- 1. Useful
- 2. Easy
- 3. Wow!

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IoT & Built Environment

Never mind the technology – where's the money?

- For each stage:

- Customer Experience

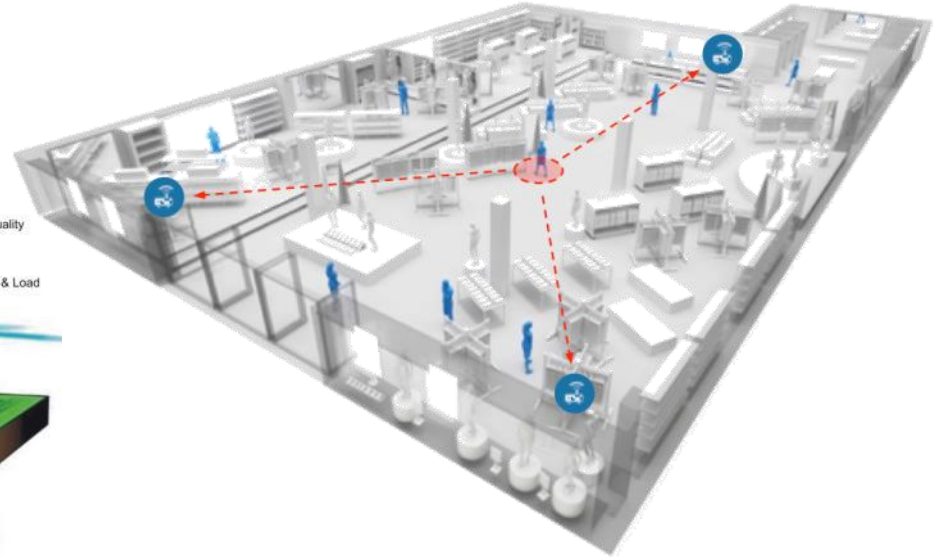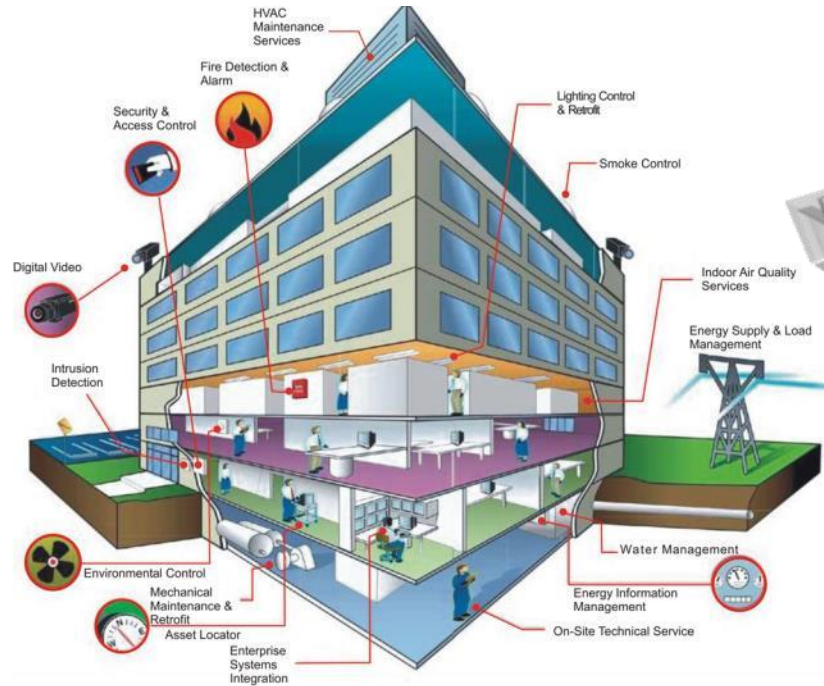- Operational Performance

- Response: Scaled Agility

€€€€?

Source: Cicso

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Smart Buildings

Assets….

People

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IoT: Rewards

Enabler!   Requires systems to respond   Each use case: unique

Inventory tracking

Improved asset availability

Asset management/security

Improved business process

Improved handover process

Space utilization

Actionable data

Auto check/cal management

Reduced running costs

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IoT: Rewards

Enabler – not a total solution!
- **Strategy → Outcomes!**

- **Use case!**

- Each use case is unique

- No fully 'off-the-shelf' solution

- Consider what dependencies are on you

- Involve all stakeholders
  - **Customers!**

- *Anticipate internal cost/effort to deliver ROI*

Bright Building - Manchester

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Strategy: Reward versus Risk

Operational performance

Customer experience

€ to bottom line?

Will it work?

Is it secure?

€ liability?

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IoT: What could go wrong?

Interoperability

Will it work?

- Internal system
  - Device – controller – cloud – app?
- Wider ecosystem?
  - Common data formats?
  - Common communication protocols?
- Legacy systems?
  - Most projects – some level of retrofit required

Will it continue to work?

- How long will platform be supported?
- 3rd party-plug-ins?
- External applications/software?

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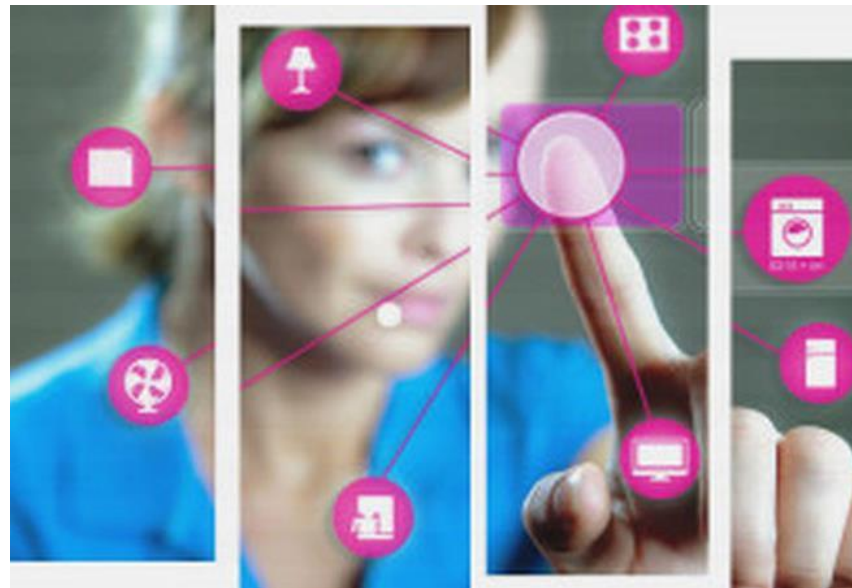
Will the system work? THROUGH LIFE!

- How long will it be supported?

- *Secure over the air updates?*
- *3rd party plug-ins?*

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Security

3 Big Issues with IoT Devices

Smart Cities: information resilience concerns

200,000 traffic sensors globally, potentially vulnerable to hack

Can they be stopped or made dangerous?

Distributed Denial of Service

- Targeted vulnerable IoT devices:
  - Cameras
  - DVD Recorders
- Took out:
  - Amazon
  - Twitter
  - PayPal
  - Spotify
  - most of US Internet

Mirai botnet, a DDoS nightmare turning Internet of Things into Botnet of things

Can they be used to attack something?

GDPR

What are they doing with the data and is it secure?

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General Data Protection Regulation

- All personal data

- *"**any information relating to an identifiable person**, including name, identification number, **location data, online identifier,** or physical, physiological, genetic, mental, economic, cultural or social identity factors relating to that person"*

- Transparency

- Clarity

- Accountability

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Tomorrow?

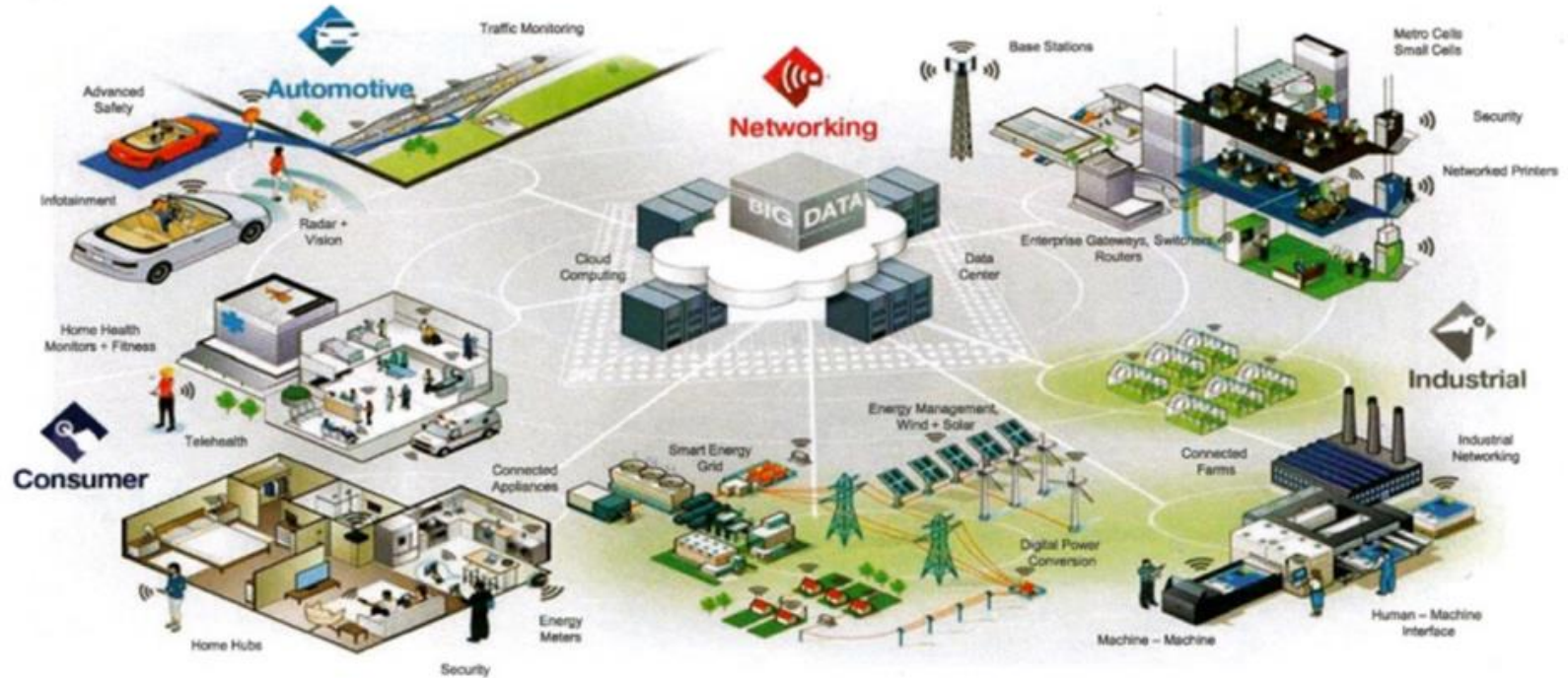# Can I be completely secure?

No such thing!
- Skill+Time+Tools+Motive
- Anything can be hacked!

- Security: appropriate for intended use and environment… ?
- **IoT: Digital meets physical!**
- *Risk Reduction*
- *Resilience*
- *Response*
- *Recovery*
- **Get expert help!**

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Functionality

Digital transformation – an enabler, not an outcome!

An IoT 'Thing' is foremost a 'Thing'!

Actuator

Sensor

IoT – Key Issues

Trust!
- Safety/security
- Interoperability
  - Internal system
  - Network
  - Legacy systems
- Functionality
  - Functional performance
  - Measurement uncertainty
- **Today and through life!**

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IoT Summary

Before the rush to connect, think...

- Strategy? Outcomes? Use Case?

- Customer experience

- Converting the technical proposition to bottom-line €?

  - **People, process, product**

- **Trust! – today and through life**

- Functionality

- Interoperability

- **Security, security, security!**

- Get your suppliers to support you

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Get expert help!

Get Help

- IoT Community, IoT Assurance, free downloads:

  https://www.bsigroup.com/en-GB/industries-and-sectors/Internet-of-Things/

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