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Cyber security risks in the Built Environment

7th December 2016

Standards, Skills & Apprenticeships

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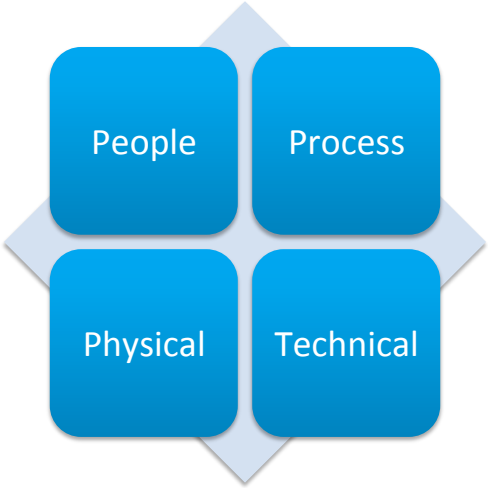
What do we mean by security?

*"Security can be defined as the state of relative freedom from **threat or harm** caused by deliberate, unwanted, hostile or malicious acts."*

Engineering Council, 2016

A holistic approach



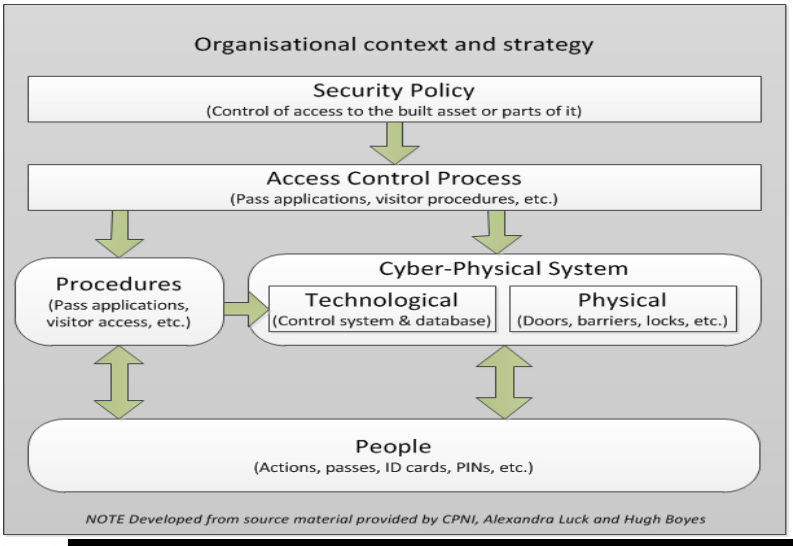
What is Cyber Security?

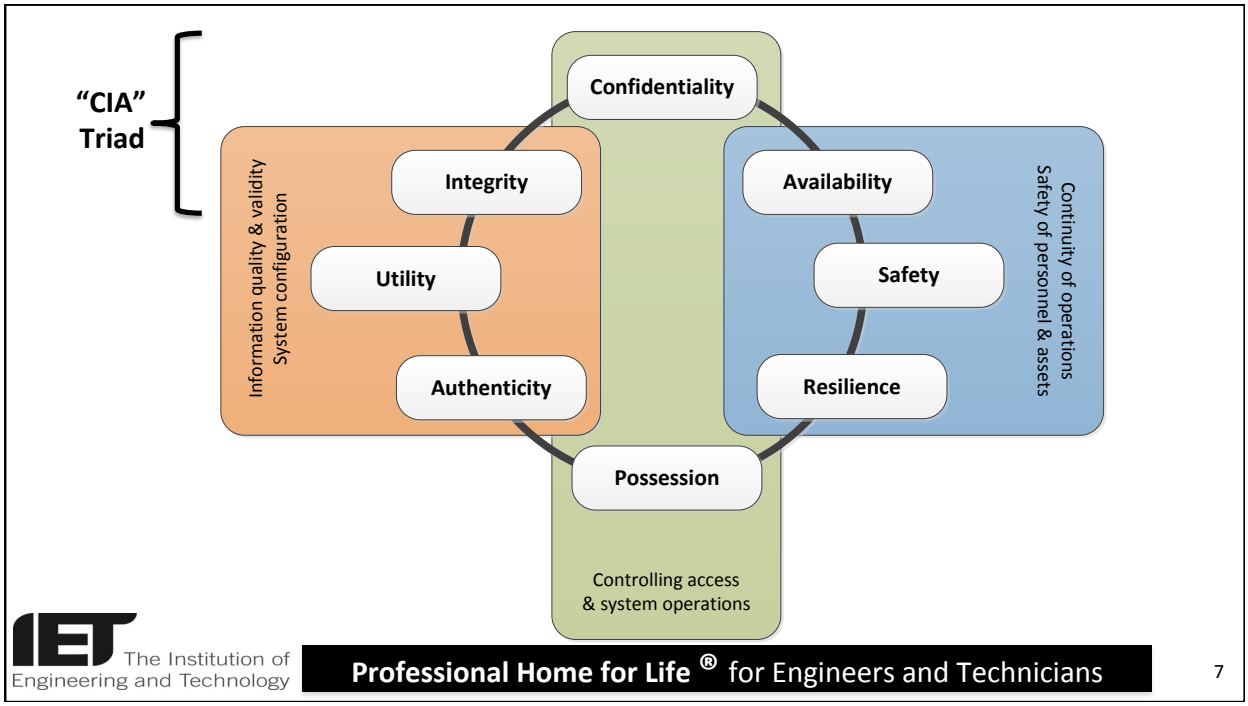
Analogue

Digital

People, Process, Physical, Technology

Understand how elements interact




"CIA" Triad
Confidentiality
Integrity
Availability
Utility
Safety
Authenticity
Resilience
Possession
Information quality & validity
System configuration
Continuity of operations
Safety of personnel & assets
Controlling access
& system operations
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Failure of (physical) controls
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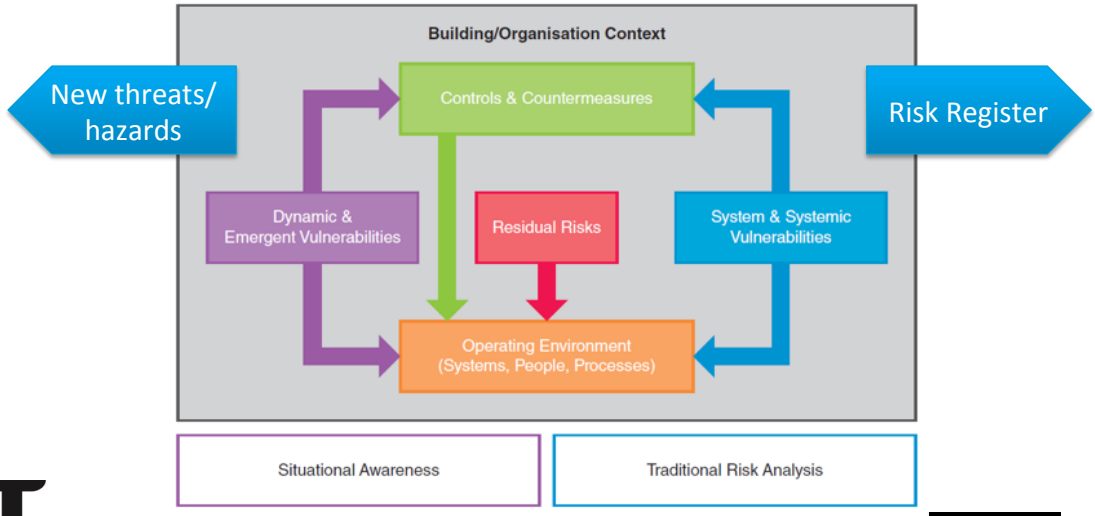
Maintaining security

A fool and his laptop …

Managing Dynamic Risks



Examples of Potential Risks

- Hostile reconnaissance
- Loss or theft of Intellectual Property (IP)
- Loss or theft of commercially sensitive information
- Loss or corruption of information
- Failure or non-availability of information systems

Hatton Garden Safe Deposit Co.

Maintaining Inventories

- #1 – Inventory of hardware assets, criticality & location
- #2 – Inventory of software assets, criticality & location

Heartbleed bug affected - OpenSSL library versions 1.01.g or later

Affected ICS suppliers included:
ABB, Certec, Digi International, Emerson Avocent, Honeywell, Innominate, McAfee, OPC Foundation, Phoenix Contact, Schneider Electric, Siemens, Sisco, Tableau

Vulnerability assessment/remediation

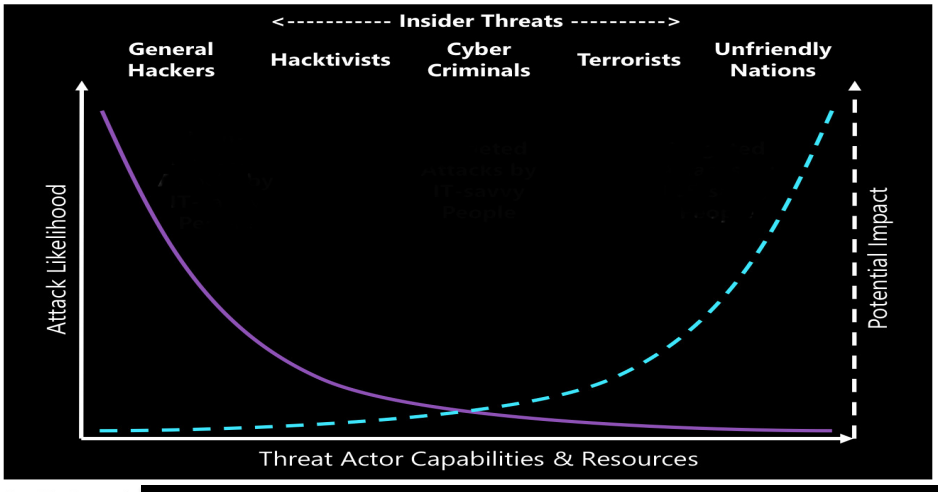
- Monitor threat agent developments
- Monitor vulnerability developments
- Monitor logs, incidents & near misses
- Monitor personnel changes and issues

Failure to respond to alarms & log incidents led to:

TARGET®

Approx 70 million cards compromised
Cost to business - $1 billion
Attacked via 3rd party (HVAC supplier)

Capability of Threat Actors



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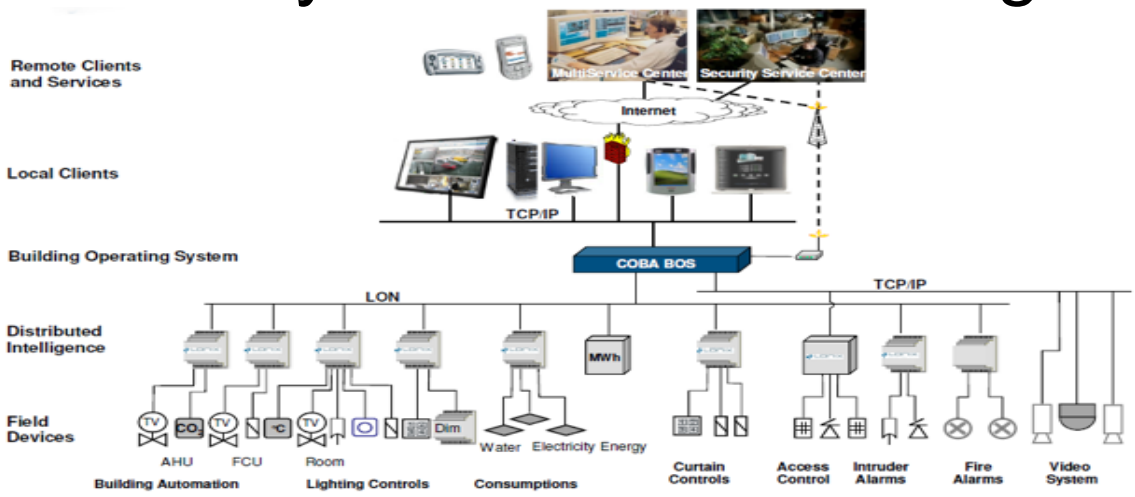
Why does security matter?

After all its only data or information …

Anatomy of a modern building



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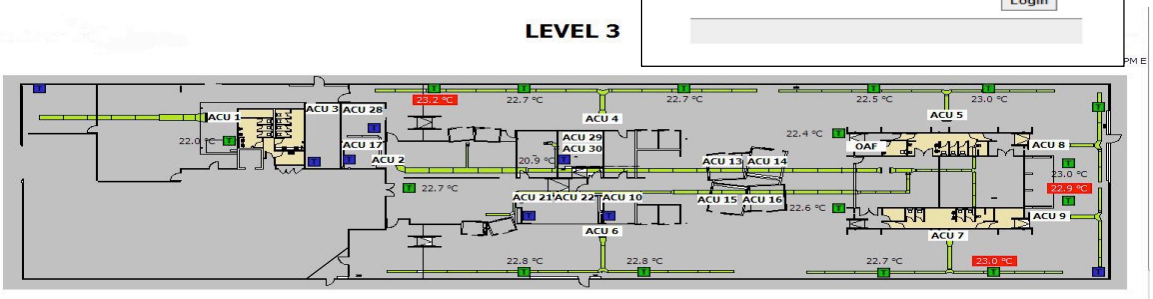
Prestigious building

Google's hi-tech offices in Sydney 17/04/13

Vulnerable control system

17/04/13 - Sydney
Building system hacked



Prison system failure - 'glitch'

13/08/13 - Prison computer 'glitch' blamed for opening cells doors

Miami TGK Jail
Miami-Dade County Jails

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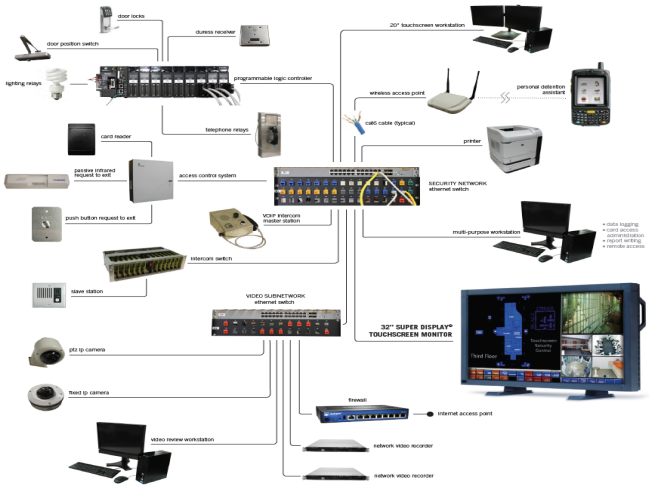
Prison Cell Door Locks – an ICS

System components

- PLC
- Ethernet switch
- Sensors
- Firewall
- IP Camera
- Workstation
- Wireless Access Point
- Mobile devices



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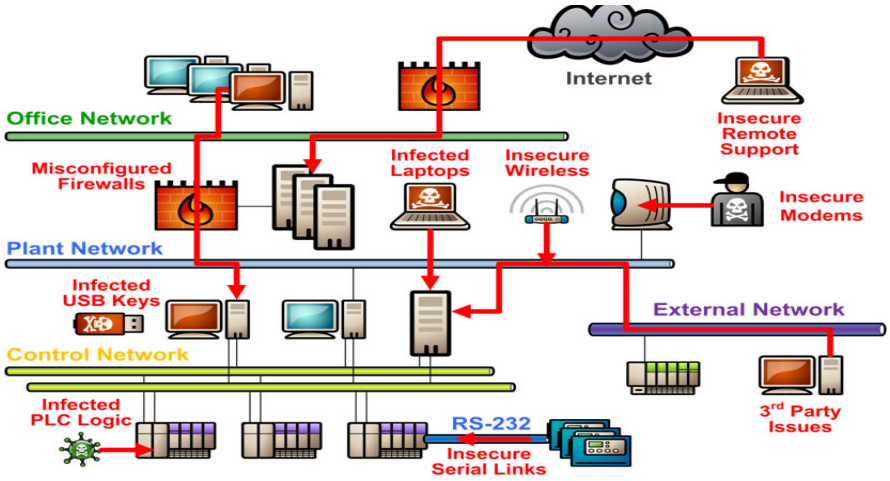
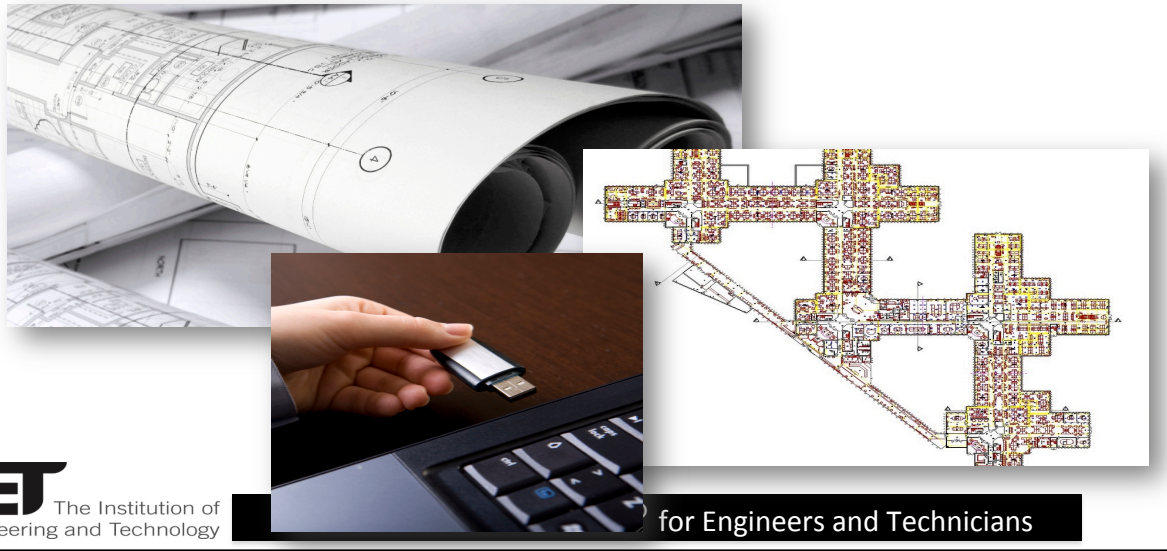
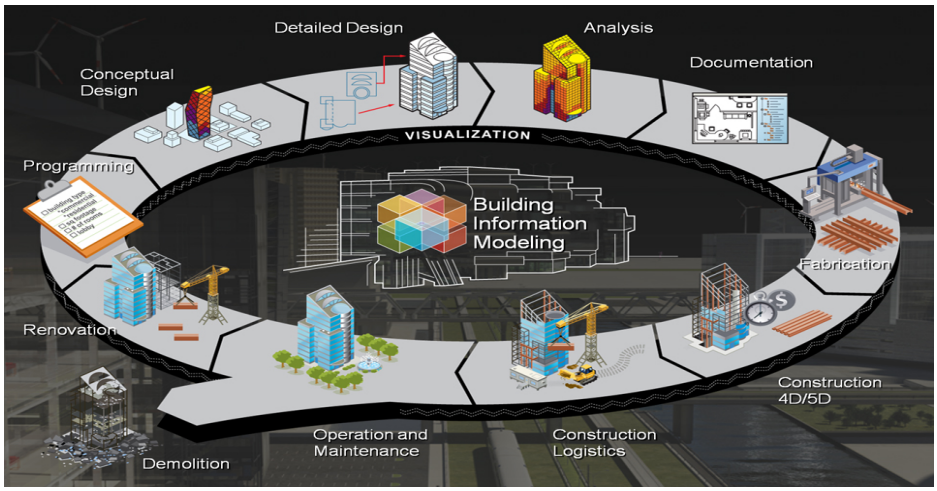
Greater system connectivity



Transition: paper to digital



Building Information Modelling



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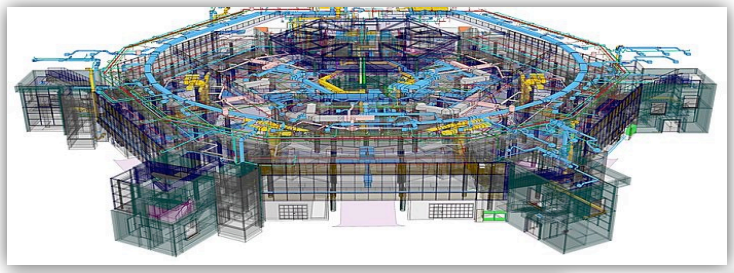
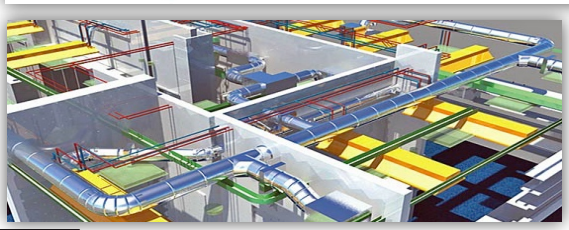
Evolving technology applications





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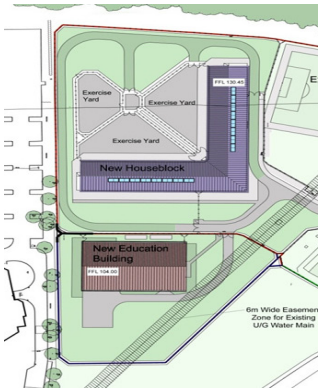
BIM Pilot Project

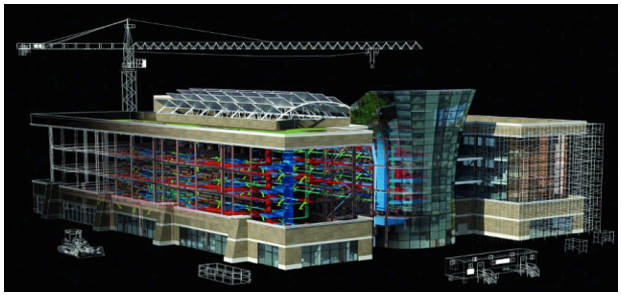
HMYOI Cookham Wood



Cyber security & resilience

Operational risks:

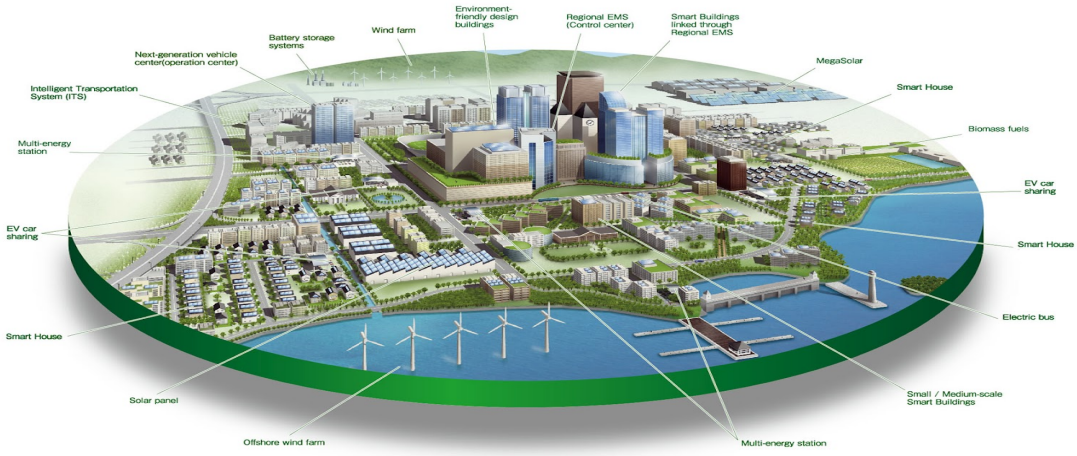
- Control system attacks
- System failures
- Loss/corruption of data
- Loss of sensitive data



Particularly affected lifecycle stages:

- Design/Redesign
- Build/Change
- Use/Operate/Maintain
- Disposal

In Future: the Smart City



Inappropriate information sharing

Once its on the Internet you cannot guarantee to control it

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Loss or compromise of PII

Pattern of Life:

- Travel card & parking data – identifies regular routes/behaviour (commuting/school runs/affairs), favourite locations/parking spots/ stops
- Smart meter data – exposes routine energy usage, e.g. premises unoccupied
- Use of social media – reveals travels, locations, relationships
- Loyalty cards – purchasing behaviour, health issues, etc

British Embassy, Warsaw

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The Internet of Things

A rapidly emerging security challenge

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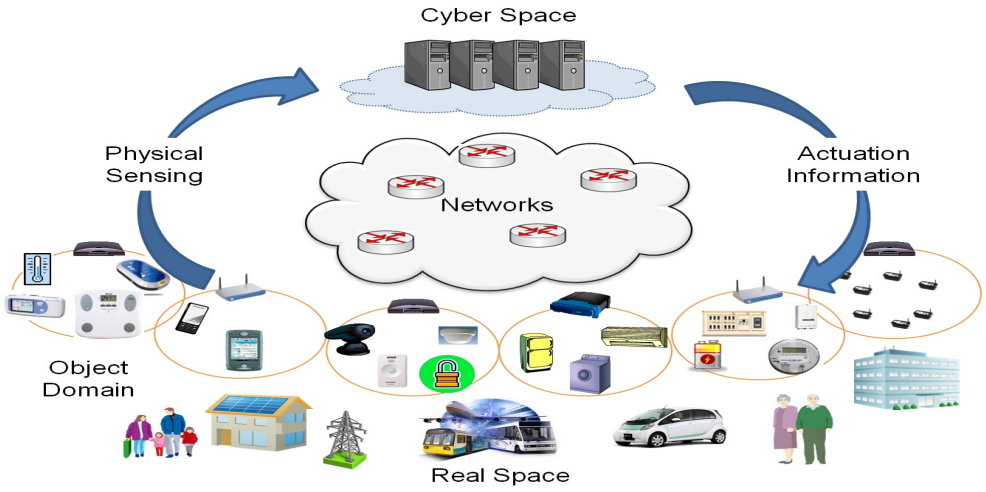
The Internet of Things (IoT)



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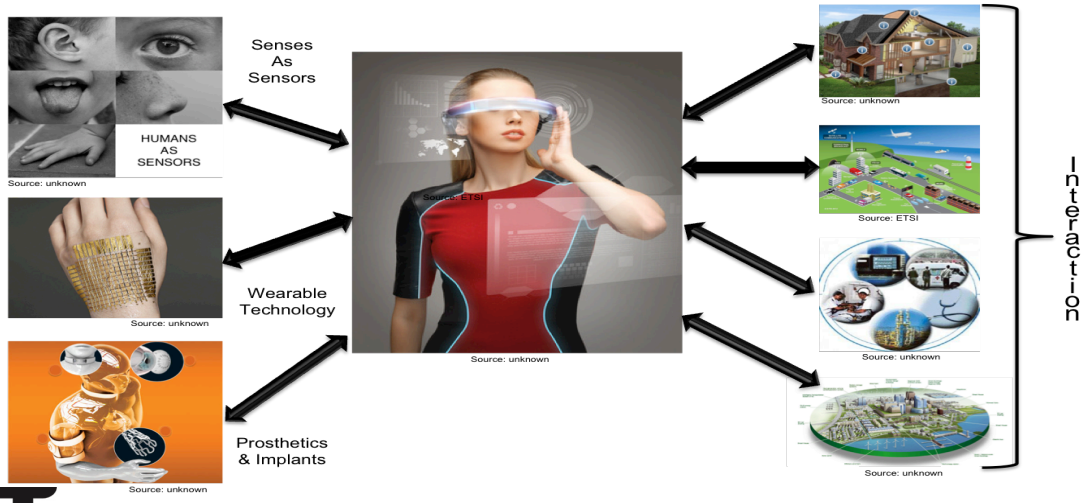
The Human in the IoT



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Cyber Security Guidance & Standards

What does good practice look like?

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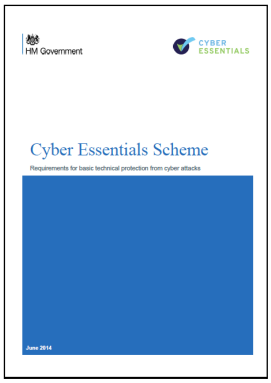
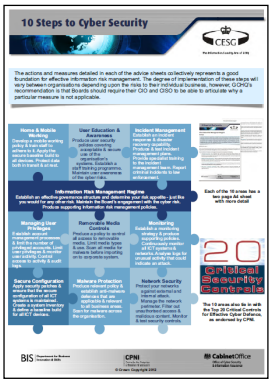
UK Government Guidance

http://www.cpni.gov.uk and http://www.ncsc.gov.uk





Cyber Essentials Scheme

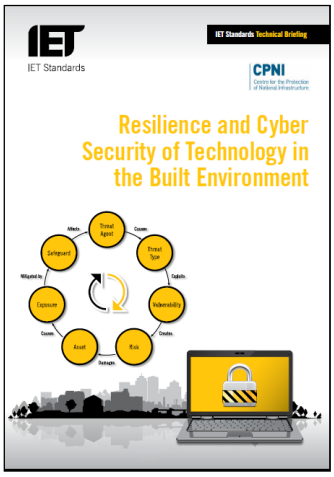
10 Steps to Cyber Security

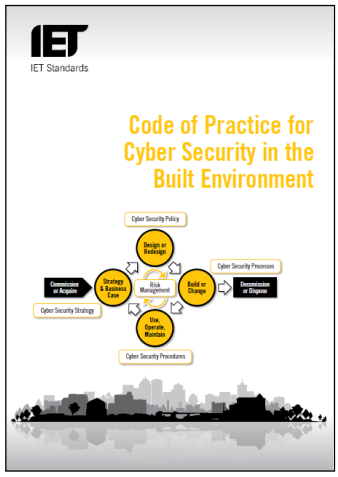
Board Security Passport

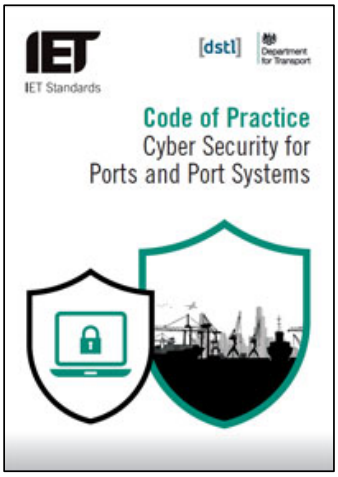
British Standards

PAS 1192-5: 2015
Specification for security-minded building information modelling, digital built environments and smart asset management

IET Standards





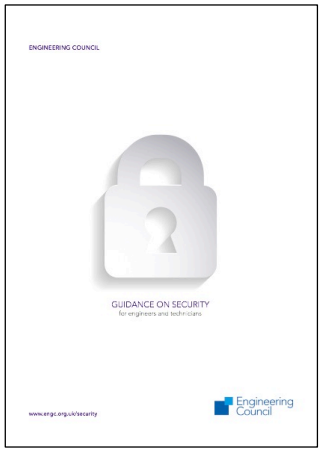


Education & Skills

New entrants and CPD

Common Human Factors

Engineering Council



Guidance on Security for engineers and technicians

1. Adopt a security-minded approach to your professional and personal life
2. Apply responsible judgement and take a leadership role
3. Comply with legislation and codes, understand their intent and seek further improvements
4. Ensure good security-minded communications
5. Understand, comply and seek to improve lasting systems for security governance
6. Contribute to public and professional awareness of security

Apprentices & Professionalism

- IoT & Cyber Systems Apprenticeships
  - Engineers - Levels 6 & 7
  - Technician – Levels 3 & 5
- Security-minded module
- Register of Security Engineers & Specialists (RSES)

Any questions?

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