

Security, Edge and Cloud Lab



Cybersecurity, Businesses, Institutions: a Holistic Approach

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- Co-Founder of the "Security, Edge and Cloud" (SECLoud <u>https://secloud.ing.unimore.it/</u>) lab, leader of cybersecurity activities for IT and Cyber-Physical systems (ACES)
- Co-director of the Cyber Academy
- Lecturer of "Sicurezza Informatica" and "Automotive Cyber Security"



UNIVERSITÀ DEGLI STUDI DI MODENA E REGGIO EMILI

Security, Edge and Cloud Lab



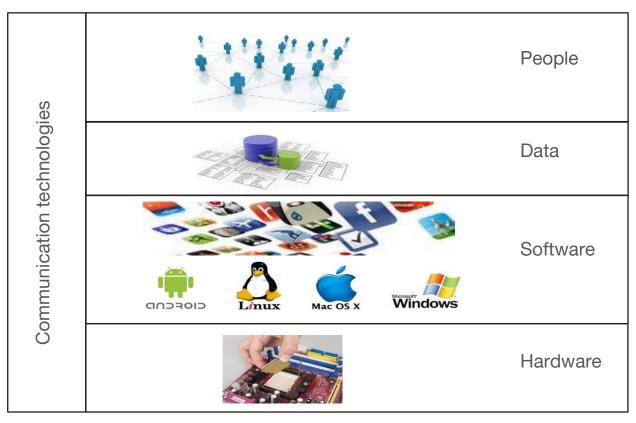




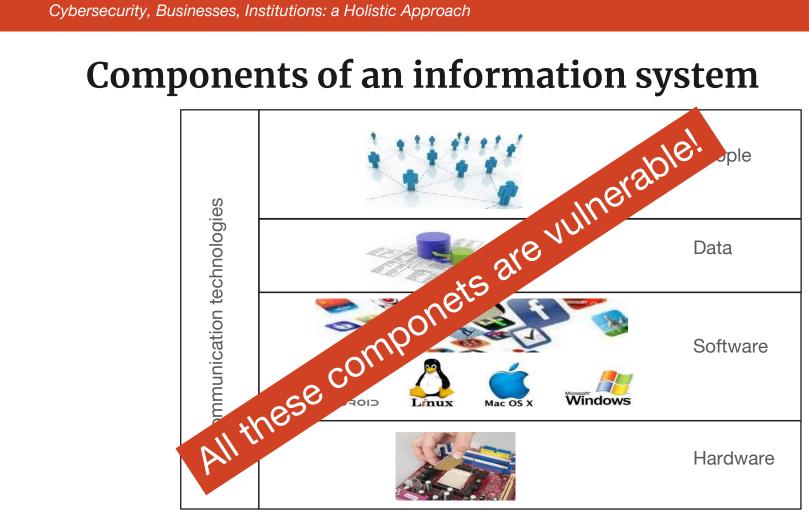
Centro di Ricerca Interdipartimentale sulla Sicurezza e Prevenzione dei Rischi - CRIS



Components of an information system



Components of an information system



Cybersecurity, Businesses, Institut

Applica

Cybersecurity: a technology issue?

We already have plenty of cybersecurity technologies...

... are we okay then?

Source: Optive Cybersecurity Landscape Map

https://www.optiv.com/sites/default/files/2024 -07/Cybersecurity-Landscape-Map-2024.pdf

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IT vs «the real world»: clash of cultures

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Under these terms, would you buy...

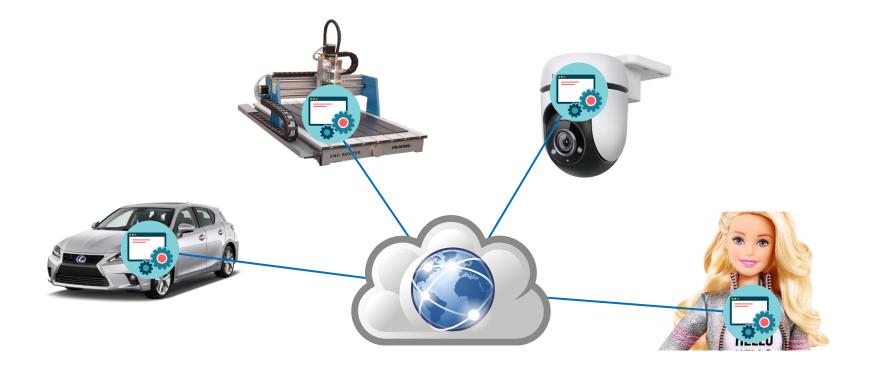








Under these terms, would you buy...



Hackers can hijack Wi-Fi Hello Barbie to spy on your children

Security researcher warns hackers could steal personal information and turn the microphone of the doll into a surveillance device



Hello Barbie listens to children and uses cloud-based voice recognition technology to understand them and talk back. Photograph: Mattel

Mattel's latest Wi-Fi enabled Barbie doll can easily be hacked to turn it into a surveillance device for spying on children and listening into conversations without the owner's knowledge.

https://www.theguardian.com/technology/2015/nov/26/hack ers-can-hijack-wi-fi-hello-barbie-to-spy-on-your-children



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Scorri sopra l'immagine per ingrandirla



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4	CVE ID	Nome	CVSS
ci	CVE-2023-30351	Remote access via hard-coded credentials	7.5 HIGH
	CVE-2023-30352	RTSP feed access via hard-coded credentials	9.8 CRITICAL
	CVE-2023-30353	Unauthenticated RCE	9.8 CRITICAL
	CVE-2023-30354	Physical access and WiFi credentials disclosure	9.8 CRITICAL
	CVE-2023-30356	Missing support for Integrity Check	7.5 HIGH







As you can see in the video, this cyberattack has been carried out carefully so to protect innocent individuals



VS



Remote to local vulnerable software running on the Infotainment system and reachable from the Internet

Lateral movement from the infotainment system it is possible to inject spoofed data that is used by other Electronic Control Units to perform many functions (including ADAS)

Reversing black box analysis of communications among all Electronic Control Units to identify ways to interfere with ADAS

Remote control fake data sent to safety-relevant Electronic Control Units from a laptop connected to the Internet, hundred of km away from the target

Impact ... engine shutdown, partial control of the steering wheel, disengaging the brakes, ...

https://www.youtube.com/watch?v=MK0SrxBC1xs

Jeep Cherokee (2014)

Cybersecurity, Businesses, Institutions: a Holistic Approach











Cybersecurity → Safety

You don't mess around with safety:

- it's not something you "patch" onto a product
- nor something to be ignored during design

... otherwise, you will not be able to sell your product!

- type-approval regulations
- CE marking
- legal obligations



IL PRESIDENTE DELLA REPUBBLICA

Vista la direttiva 2006/42/CE del Parlamento europeo e del Consiglio, del 17 maggio 2006, relativa alle macchine [...]

E M A N A il seguente decreto legislativo:

ART. 1

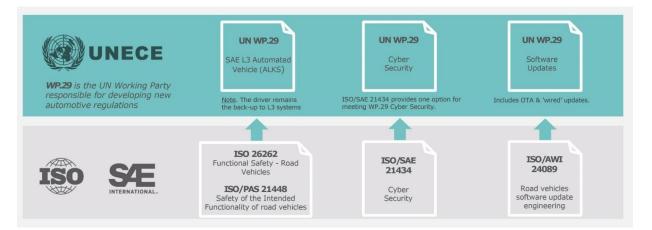
 Le norme del presente decreto legislativo si applicano ai seguenti prodotti [...]:
 a) macchine:

- b) attrezzature intercambiabili;
- c) componenti di sicurezza;
- d) accessori di sollevamento;
- e) catene, funi e cinghie;
- f) dispositivi amovibili di trasmissione meccanica;
- g) quasi-macchine.

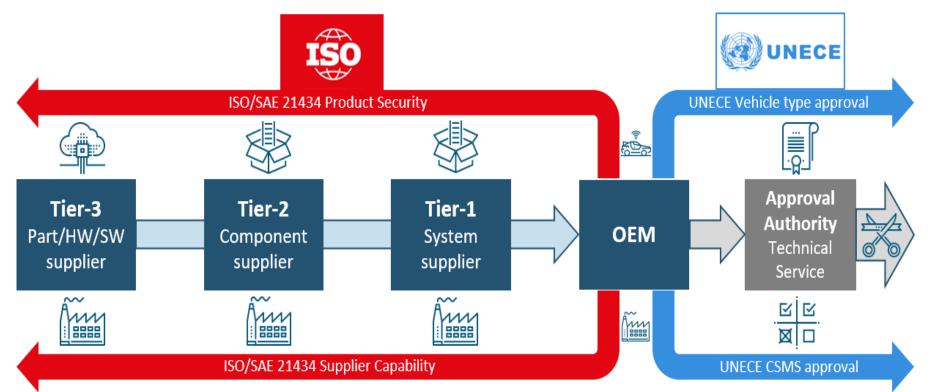
In the automotive domain...

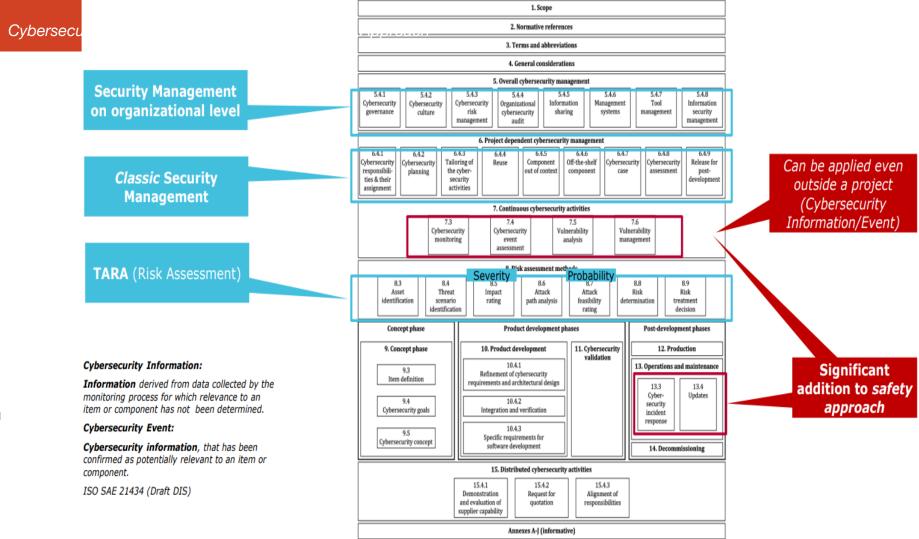


UN Regulation No. 155 - Cyber security and cyber security management system UN Regulation No. 156 - Software update and software update management system



Cybersecurity trickles down the whole supply chain









Shaping Europe's digital future

Home Policies Activities News Library Funding Calendar Consultations Al Office

Home > Policies > EU Cyber Resilience Act

And the automotive domain is not an exception...

EU Cyber Resilience Act

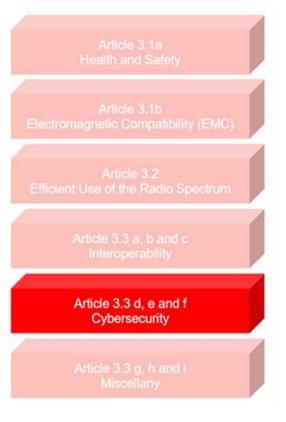
New EU cybersecurity rules ensure safer hardware and software.

From baby-monitors to smart-watches, products and software that contain a digital component are omnipresent in our daily lives. Less apparent to many users is the security risk such products and software may present.

The <u>Cyber Resilience Act (CRA)</u> aims to safeguard consumers and businesses buying or using products or software with a digital component. The Act would see inadequate security features become a thing of the past with the introduction of mandatory cybersecurity requirements for manufacturers and retailers of such products, with this protection extending throughout the product lifecycle.

Radio Equipment Devices

- Cybersecurity requirements for any device that connects to a computer network via radio frequency communications (any form)
- It comes into force in Italy in August 2025!



Cybersecurity, Businesses, Institutions: a Holistic Approach



DECRETO LEGISLATIVO 4 settembre 2024, n. 138

Recepimento della direttiva (UE) 2022/2555, relativa a misure per un livello comune elevato di cibersicurezza nell'Unione, recante modifica del regolamento (UE) n. 910/2014 e della direttiva (UE) 2018/1972 e che abroga la direttiva (UE) 2016/1148. (24G00155)

(GU n.230 del 1-10-2024)

... standards, directives, regulations ...

DIRETTIVA (UE) 2022/2555 DEL PARLAMENTO EUROPEO E DEL CONSIGLIO

del 14 dicembre 2022

relativa a misure per un livello comune elevato di cibersicurezza nell'Unione, recante modifica del regolamento (UE) n. 910/2014 e della direttiva (UE) 2018/1972 e che abroga la direttiva (UE) 2016/1148 (direttiva NIS 2)



REGOLAMENTO (UE) 2023/1230 DEL PARLAMENTO EUROPEO E DEL CONSIGLIO

del 14 giugno 2023

relativo alle macchine e che abroga la direttiva 2006/42/CE del Parlamento europeo e del Consiglio e la direttiva 73/361/CEE del Consiglio

REGOLAMENTO (UE) 2022/2554 DEL PARLAMENTO EUROPEO E DEL CONSIGLIO

del 14 dicembre 2022

relativo alla resilienza operativa digitale per il settore finanziario e che modifica i regolamenti (CE) n. 1060/2009, (UE) n. 648/2012, (UE) n. 600/2014, (UE) n. 909/2014 e (UE) 2016/1011

... standards, directives, regulations ...



Healthcare

IEC SC 62A

ISO/IEC 80001

(via Joint Working Group with ISO)

risk management for IT-networks incorporating medical devices



Industry IEC TC 65

series of publications that specify security requirements for industrial automation and control systems (IACS)



Shipping IEC TC 80 IEC 63154

maritime navigation and radiocommunication equipment and systems



Nuclear power plants (NPPs) IEC SC 45A

IEC 62645

protection of microprocessor-based information and control systems in nuclear power plants

IEC 62859

framework for managing the interactions between safety and cyber security.



Electric power utilities IEC TC 57 IEC 61850

series of publications for communication networks and systems for power utility automation

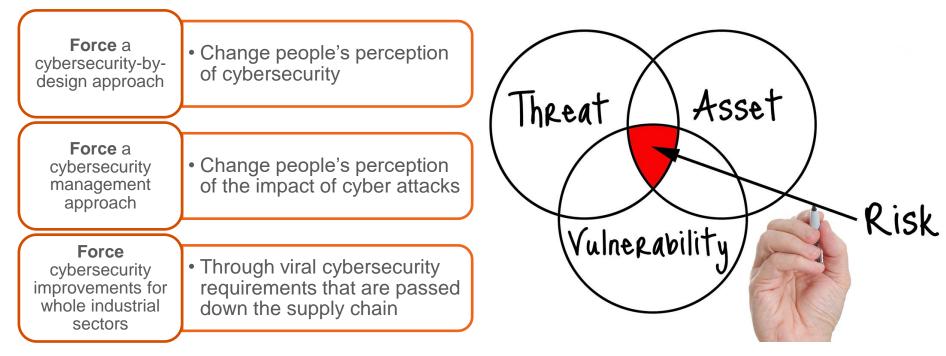
IEC 60870

series for telecontrol equipment and systems

IEC 62351

series on power systems management and associated information exchange

The roles of institutions



Will it work?

Hopefully so! It worked quite well in the financial sector...

It is working in the automotive sector...

Will it be easy and painless? Probably not... It wasn't for the financial sector. It isn't for the automotive sector.

