



**NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT  
IN INFORMATICS - ICI BUCHAREST**

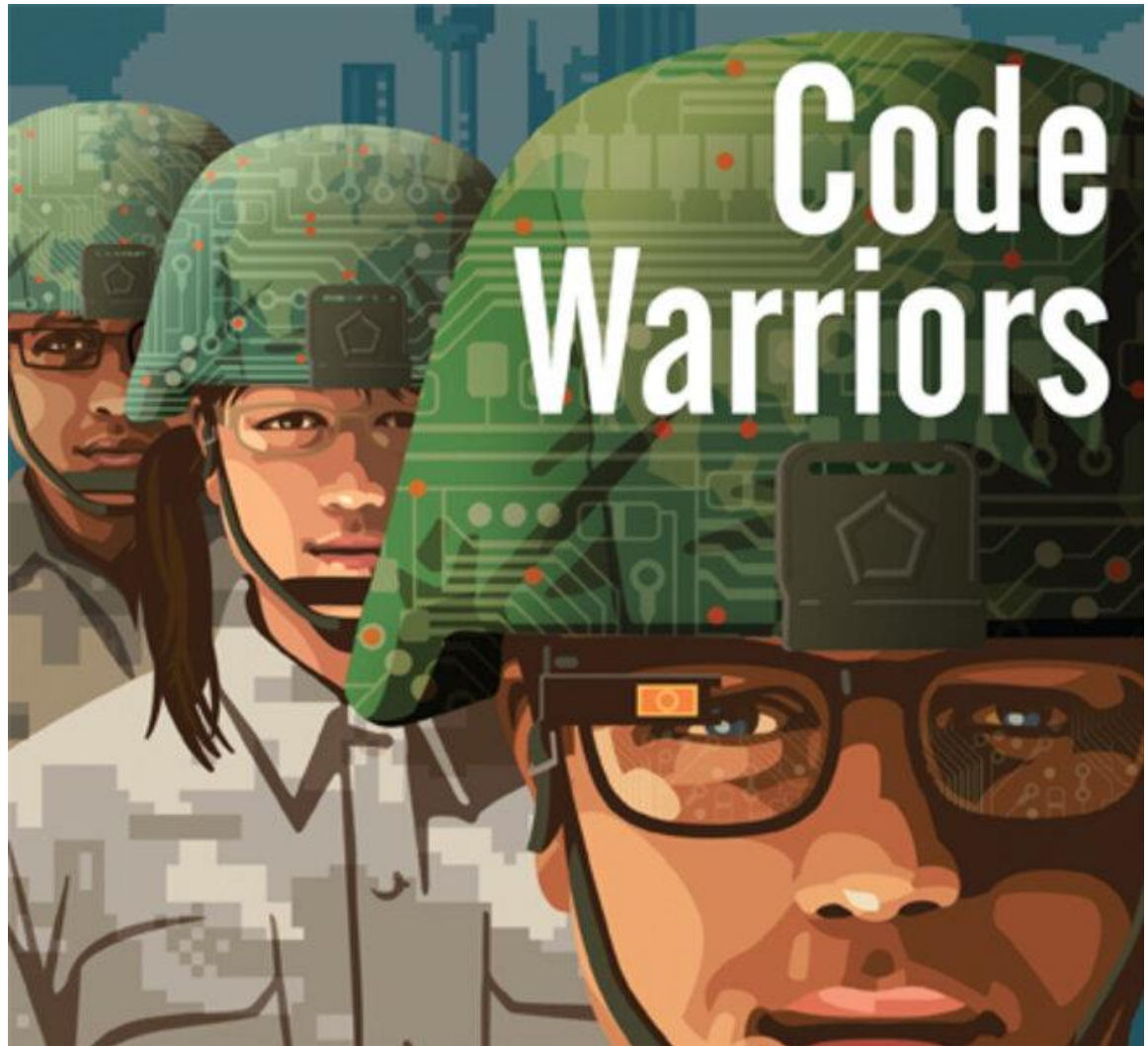
# **Innovation in Cybersecurity**

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**Dr. Eng. Adrian Victor Vevera  
General Director  
ICI Bucharest**

# We are in a cyber arms race

- We are in a continuous race to ensure cybersecurity
- This is a race that we are always on the verge of losing
- We are faced not just with cybercriminals, but also ideological actors and state-sponsored entities or actual states
- At the same time, we are in a race against the security implications of rising complexity in CI, cyber-physical systems and transborder infrastructures



# Complex Systems Challenges (Gheorghe et al, 2019)

– everything applies to cyber systems as well





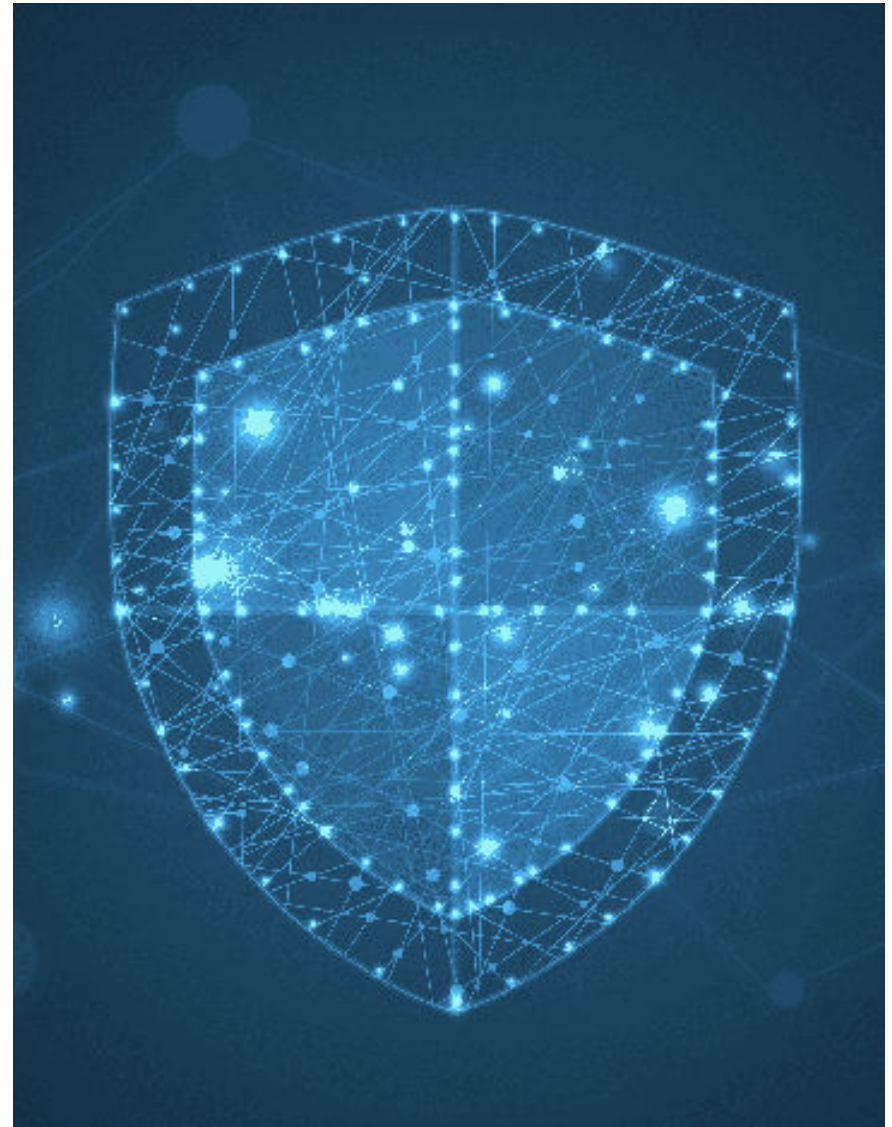
# How did we end up here

- The digitalization of life, society, the economy and politics
- Hybrid warfare and asymmetric warfare, including tactics such as state sponsored actors and proxies
- Targeting civilian infrastructure – banks, power generation and transmission, retailers, hospitals
- Transborder (dis)organized crime
- Global challenges related to networks, technologies, infrastructure, standards, regulations, conduct etc.
- Emerging technologies rapidly being implemented for profit and efficiency



# What is cybersecurity innovation about?

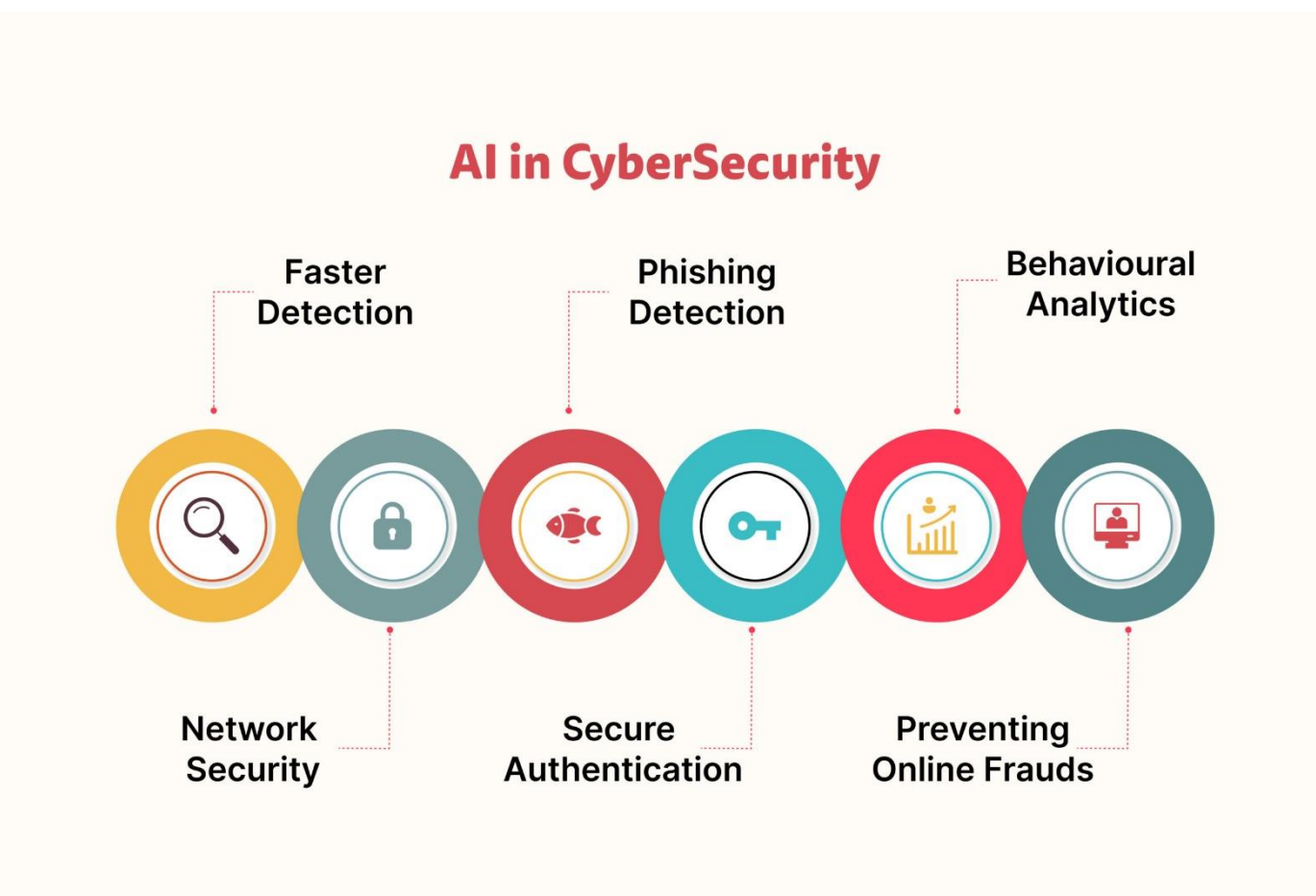
- The allocation of resources for cybersecurity purchases
- The pipeline for new products and services
- The pipeline and maturation rate for new technologies
- The possibility of the exchange of information, including in an automated way
- The development of cybersecurity culture as part of security culture in general
- Resilience by design in new critical infrastructures/critical entities
- A strategic culture that prioritizes cybersecurity
- Education that prioritizes lifelong training, competence certification and retention
- The deliberate reinforcement of strategic targets such as the Three Seas Initiative project
- Regional and global cybersecurity governance





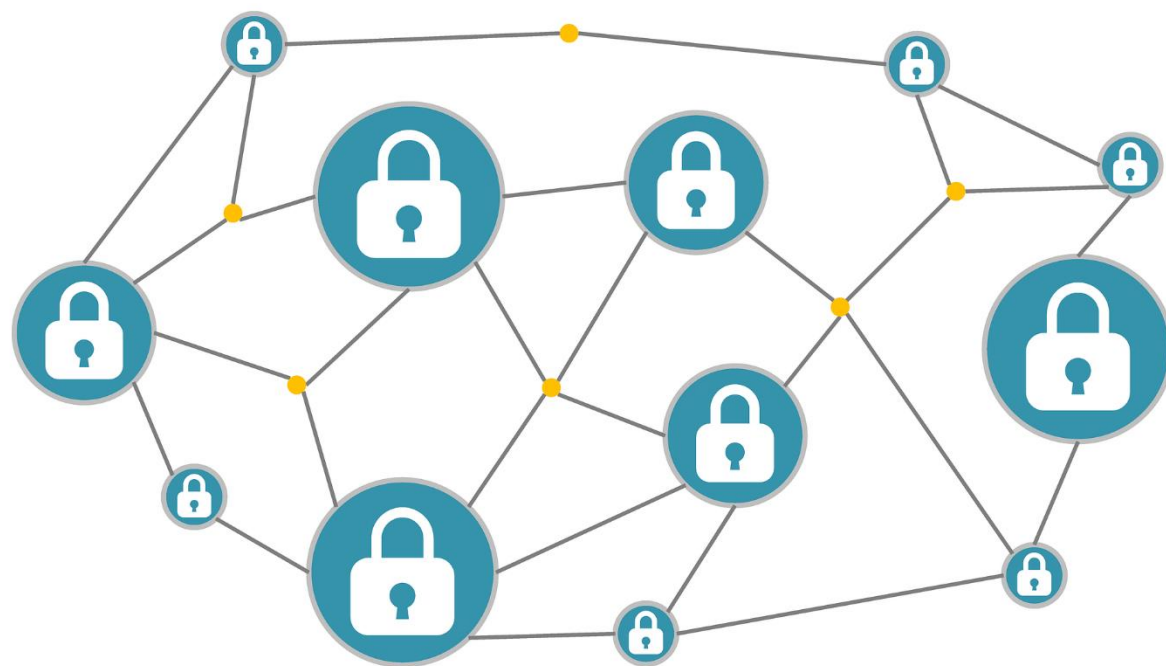
# 1. Artificial Intelligence and Machine Learning

- AI can become a gamechanger in cybersecurity, both as defender and attacker
- These systems can analyze enormous amounts of data quickly, without the need for human oversight, making them ideal for identifying suspicious activity and defending against advanced threats.
- Cybersecurity professionals are already leveraging AI and ML to detect real-time cyberattacks, making their role even more important in maintaining a secure online environment.



## 2. Distributed ledger technology

- Provides a secure and immutable ledger of data to store critical assets
- Entities can reduce their risk of cybercrime by inactivating record manipulation and unauthorized access.
- Multiple authentication steps are required for any changes to be made in a blockchain network, allowing for an enhanced level of distrust among users.
- Blockchain networks an effective tool for verifying identity, increasing data security, and preventing malicious data breaches.



### 3. Zero-trust architectures





## 4. Behavioral Analytics

- This technology allows all behavioral data to be stored and then processed to examine trends, patterns and habits in each user's workflow.
- A behavioral baseline is created for the whole organization and when, for example, an abnormal increase in data transmission from a certain device happens, it indicates a possible cybersecurity issue.
- While this cybersecurity innovation was used for networks at first, it now shows an increasing application in user devices.



### IMPORTANCE OF NETWORK BEHAVIOR ANALYSIS



## 5. Hardware Authentication

- Generates unique and temporary cryptographic code for users to type in alongside the password in order to gain access to stored data.
- This kind of approach relies on dedicated physical evidence for user authentication, in combination with a password.
- Physical security tokens can still be lost or stolen from legitimate users, but the scope is much lower for malicious interference.
- 2FA is something that is already widely adopted, while embedded authenticators as a technology for verification of user's identity are on the rise.





## 6. Do not forget Cyber Governance, through Cyber Diplomacy





**THANK YOU**

**National Institute for Research and Development in Informatics - ICI Bucharest**

**Cybersecurity and Critical Infrastructure R&D Department  
8-10 Averescu Avenue, 011455, Bucharest, Romania  
office@ici.ro**

**WWW.ICI.RO**

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