Nationaal Cyber Security Centrum
Ministerie van Justitie en Veiligheid

Securing OT

too hard or not for me?

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NCSC

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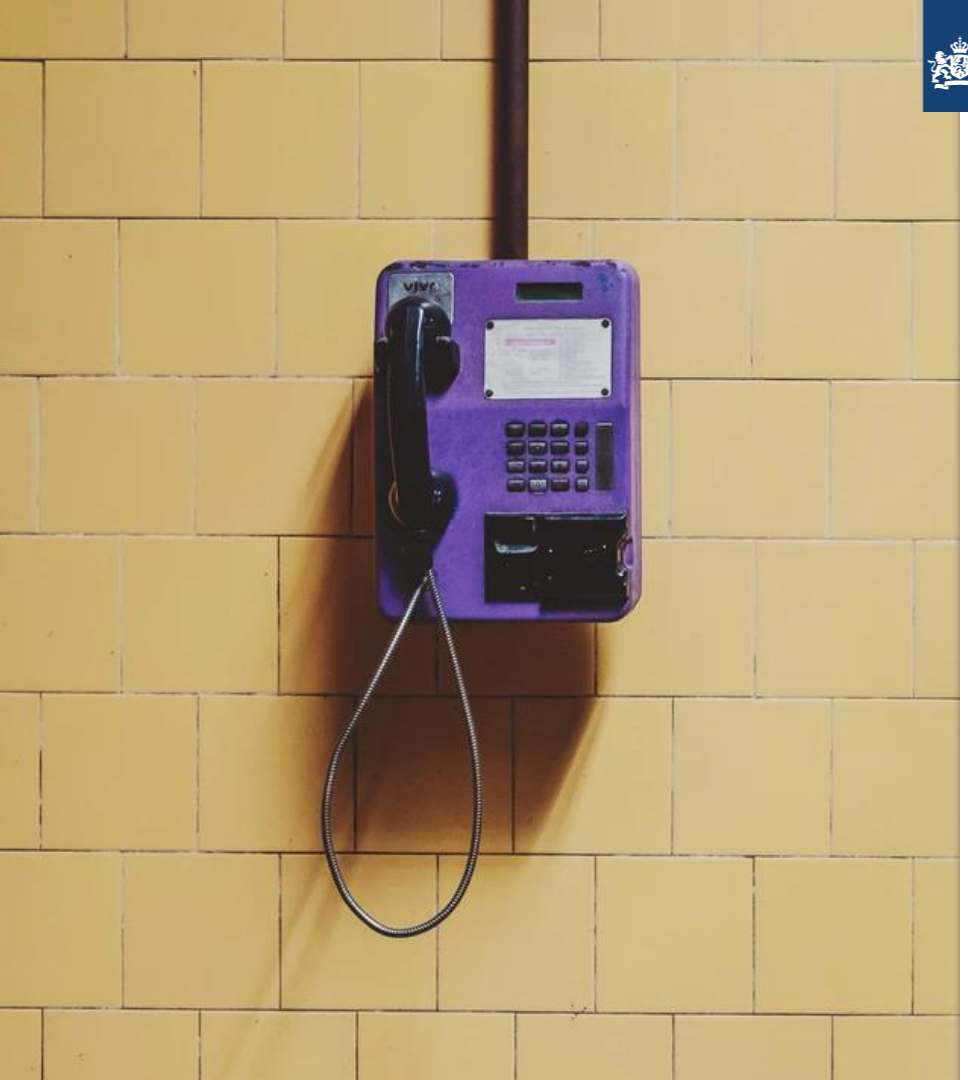
"I've hacked the planet and now I'm tracking what the bad guys do."

Why this presentation?

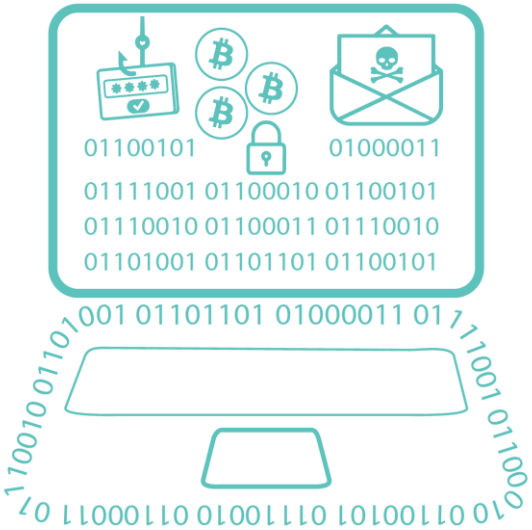


OT vs IT

Differences

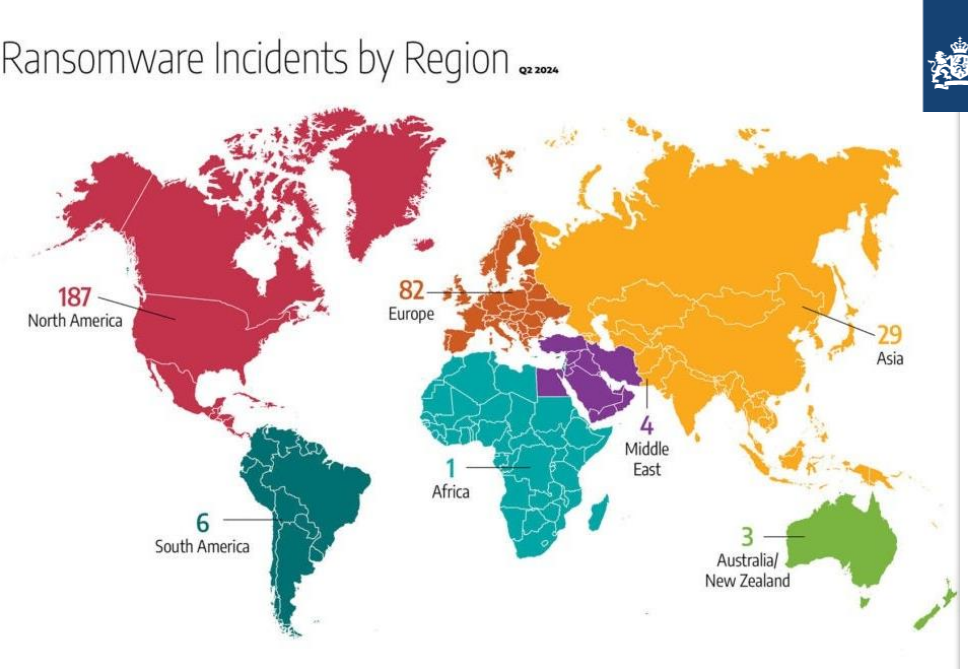
- Legacy (30+ years)
- Availability is most important
- Designed with **safety** in mind, not security
- Insecure by design
- Incidents may have a physical impact

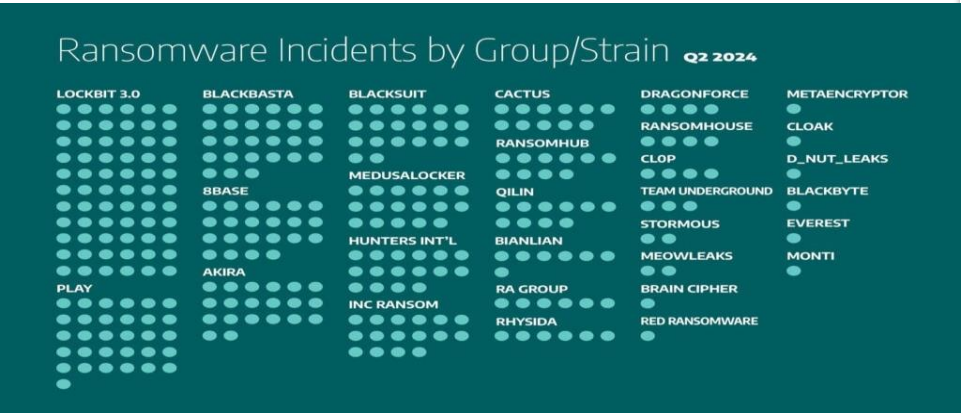
Threat actors



Ransomware

- Untargeted
- Not specifically targeting OT processes
- Focus on IT systems, which may have cascading effects on OT
- Increasing number of incidents

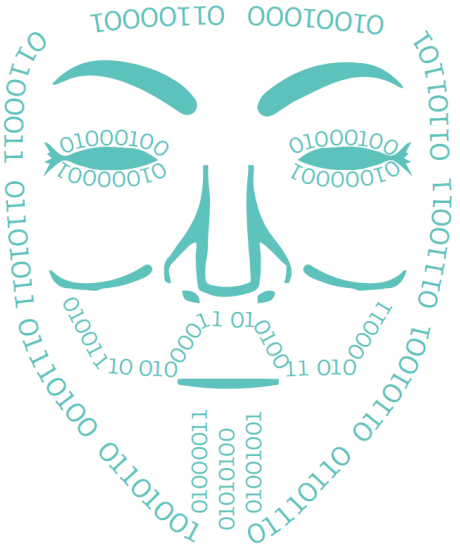




Dragos Industrial Ransomware Analysis

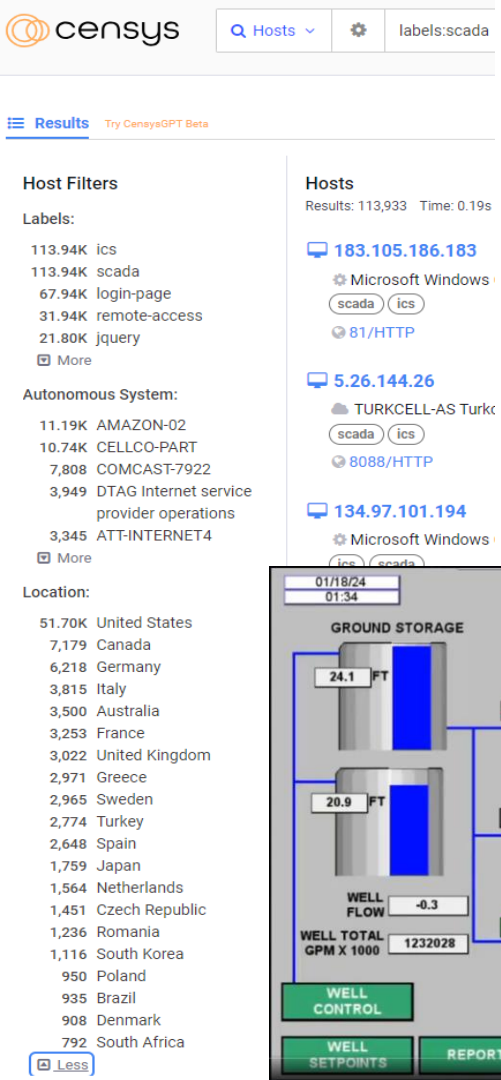
Q2 2024

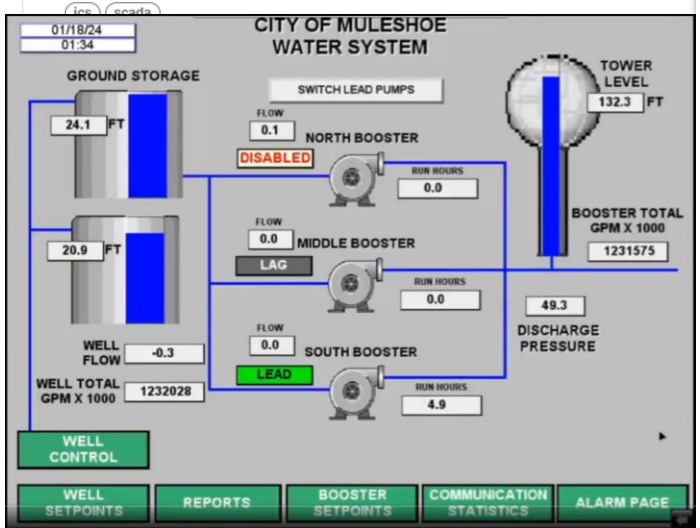
- Increase compared to Q1
- Government-affiliated groups adopt ransomware tactics
- No direct targeting of ICS/OT processes, the interconnected nature of IT and OT environments can have significant downstream effects on OT operations.
- [Dragos Industrial Ransomware Analysis: Q2 2024 | Dragos]



Hacktivism

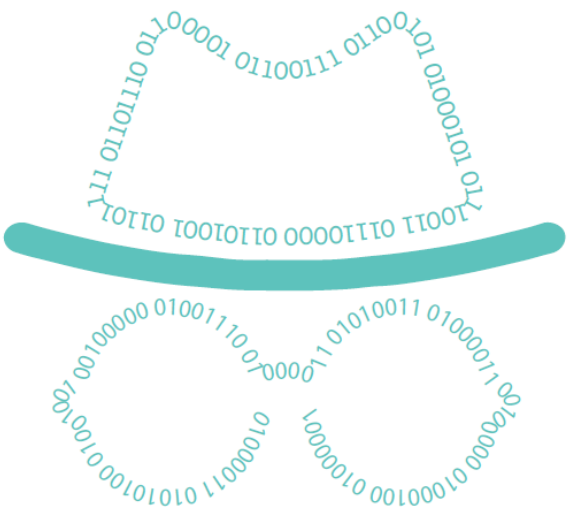
- Untargeted, device oriented
- Diverse group, ties to APTs have been identified
- Mostly targeting internet connected OT devices
- Low technical complexity, regardless physical impact





Internet connected OT devices

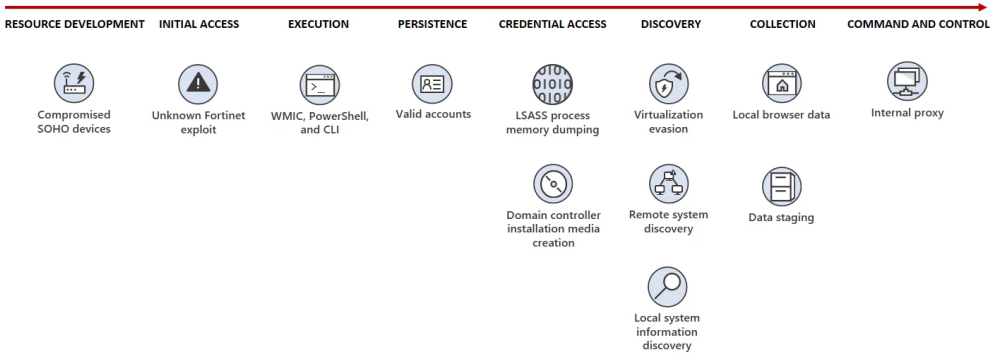
- CyberArmyofRussia_Reborn (CARR), linked to Sandworm caused water tank overflow in Muleshoe, Texas.
- CyberAv3ngers, run by the Iranian Government Islamic Revolutionary Guard Corps targeted Unitronics PLCs.
- Solntsepek targeted Ukrainian telco's with wiperware.
- Claims may be false or hard to verify.



Spionage

- Targeted
- Mostly critical infrastructure
- Information gathering & prepositioning

Volt Typhoon

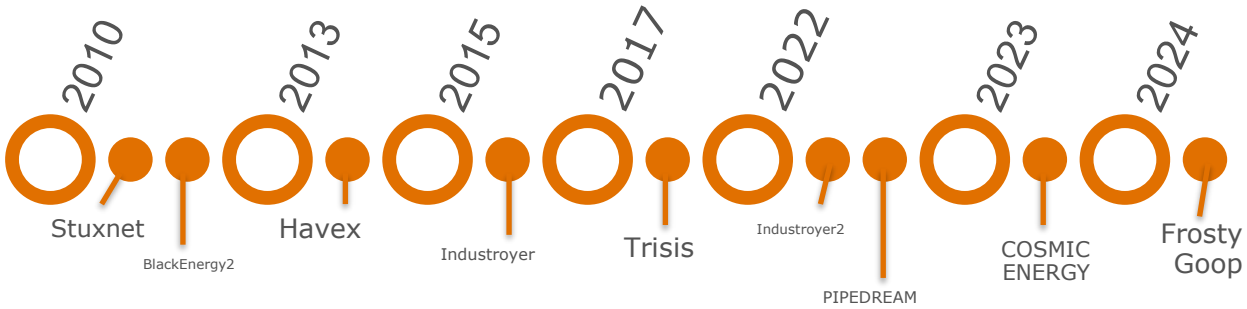


- Targeting US critical infrastructure
- Routes traffic through SOHO devices
- Initial access through compromising Fortinet devices
- Tries to maintain access for a long time
- [Volt Typhoon targets US critical infrastructure with living-off-the-land techniques | Microsoft Security Blog]

Sabotage

- Extremely targeted
- Only 9 ICS specific malware families identified.
- Some discovered before deployment, others caused incident.
- Sabotage may have political consequences.

Timeline ICS specific malware

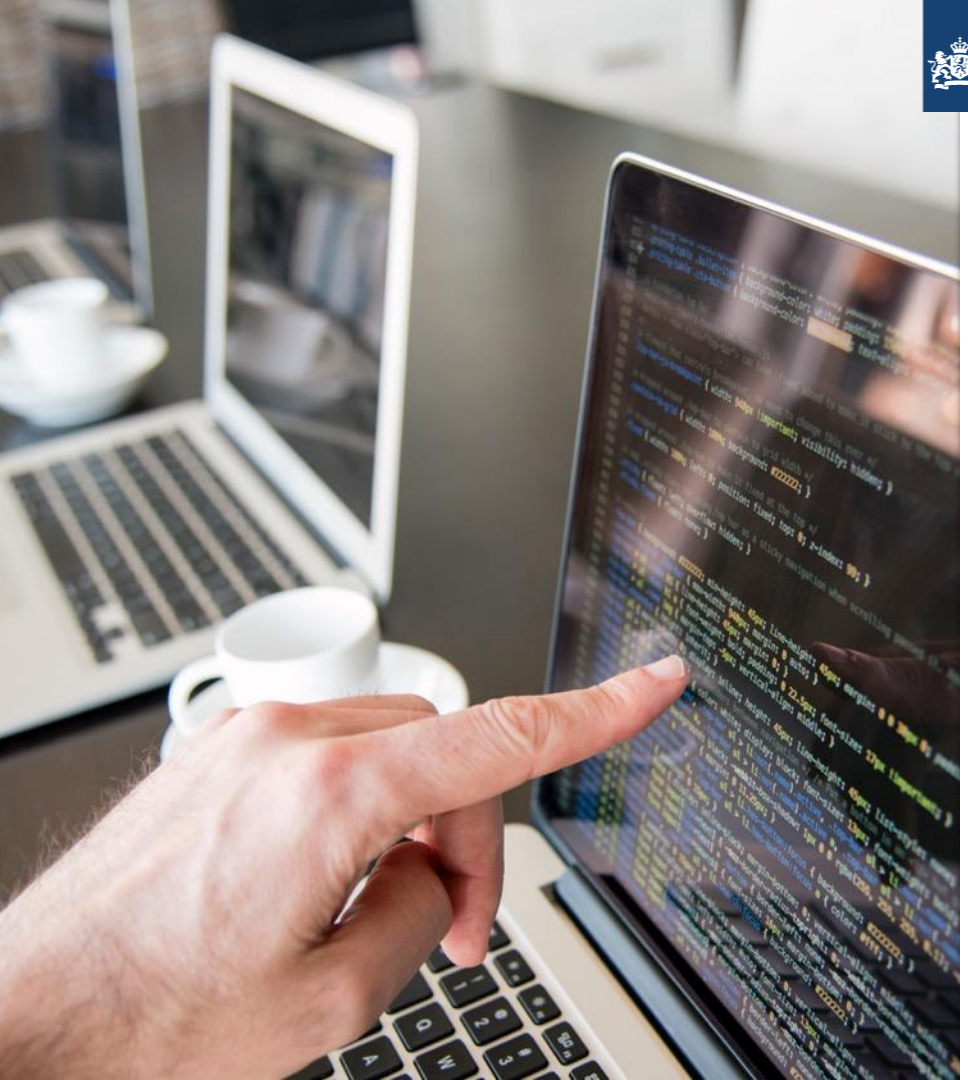


Common vulnerabilities and weaknesses OT environments

Security testing

OT

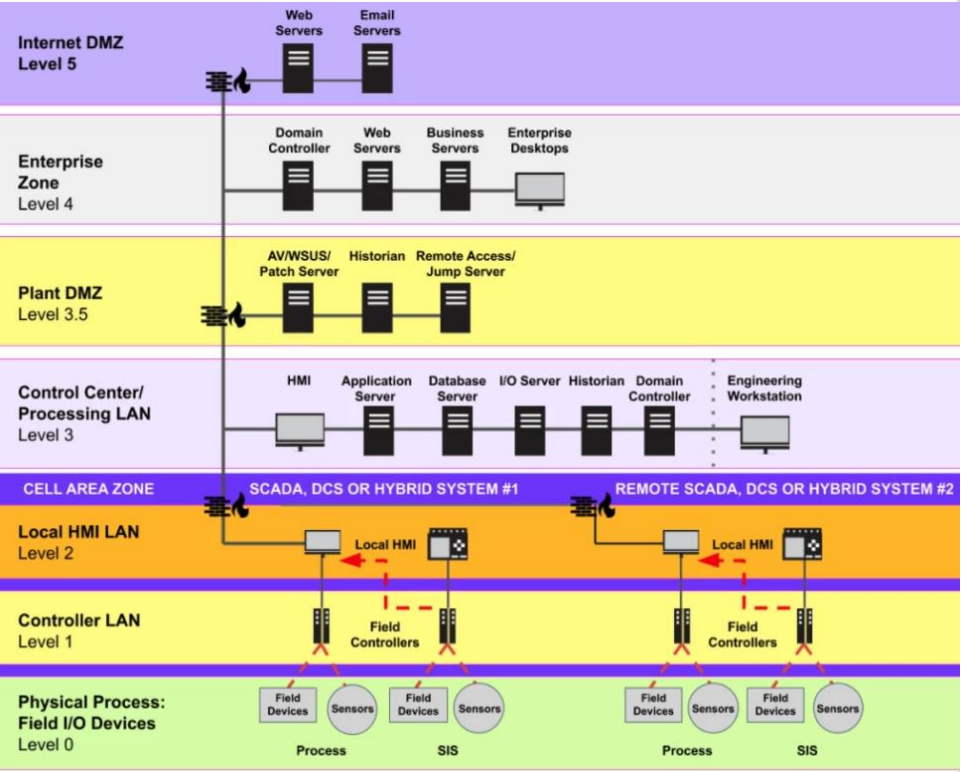
- Systems less resistant to security testing.
- Almost no test environments, spare parts or redundancy.
- OT security assessment is a combination of architecture & configuration review, combined with light security testing.
- [Scanning Highly Senstive Networks - v3.pdf - Google Drive]



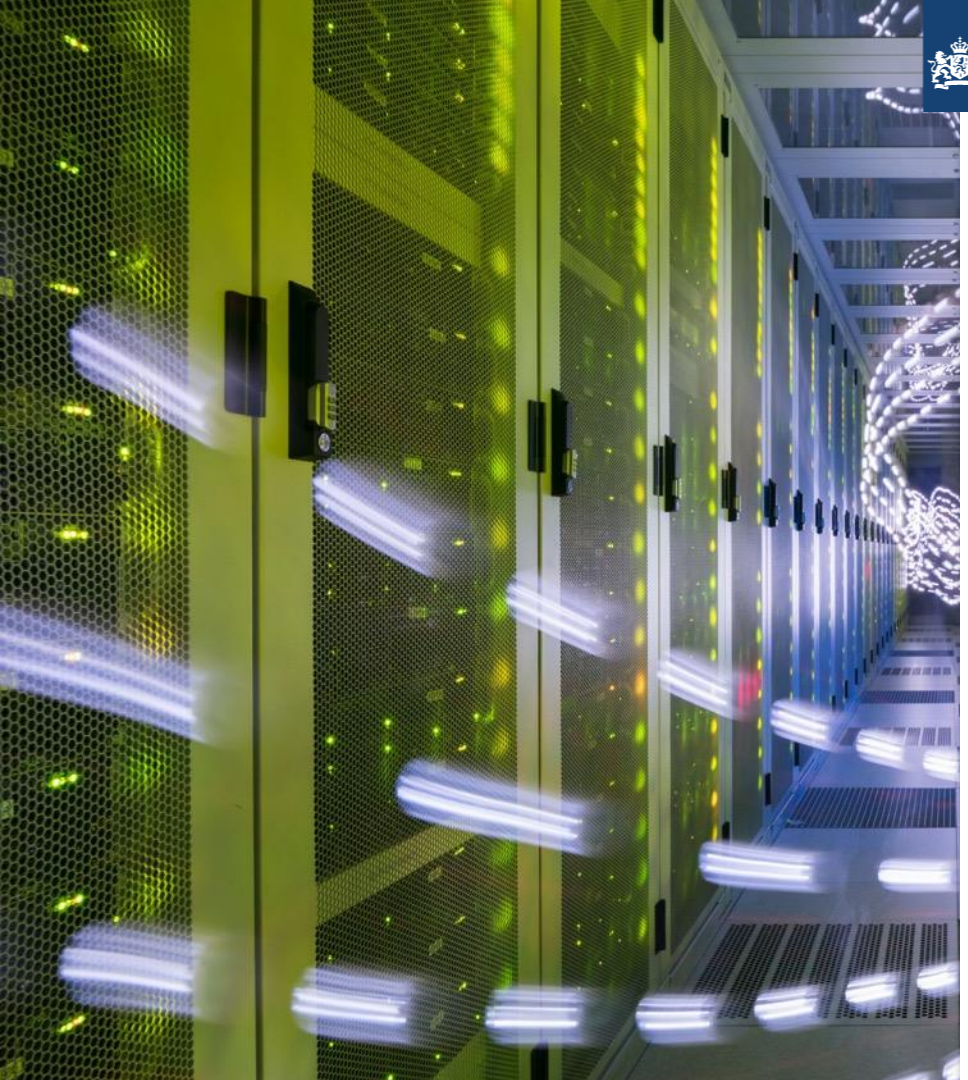
Review network design & security architecture

- Network drawings & asset overview
- Firewall & network switch configurations
- Remote access
- Virtualisation shared between IT/OT

Purdue model

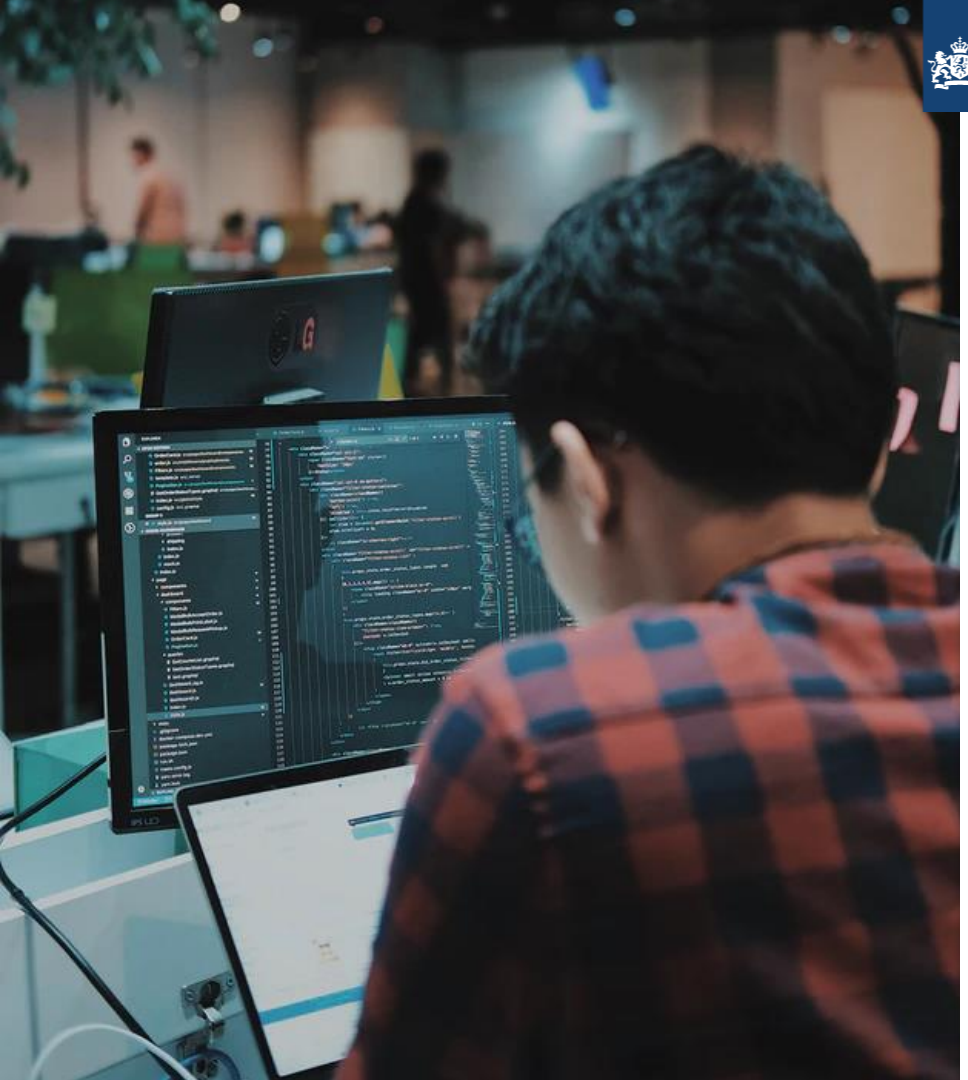


- No direct connections between IT/OT or internet, only through intermediate systems in Plant DMZ
- Firewall between IT/OT and level 3 and 2.
- OT systems pull data from systems in Plant DMZ.
- Strict firewall rules, no any.



Windows systems

- HMI, SCADA, Engineering Workstation, Domain controllers, Application servers.
- Active Directory shared or trusted between IT/OT.
- Vulnerabilities & patching
- Hardening



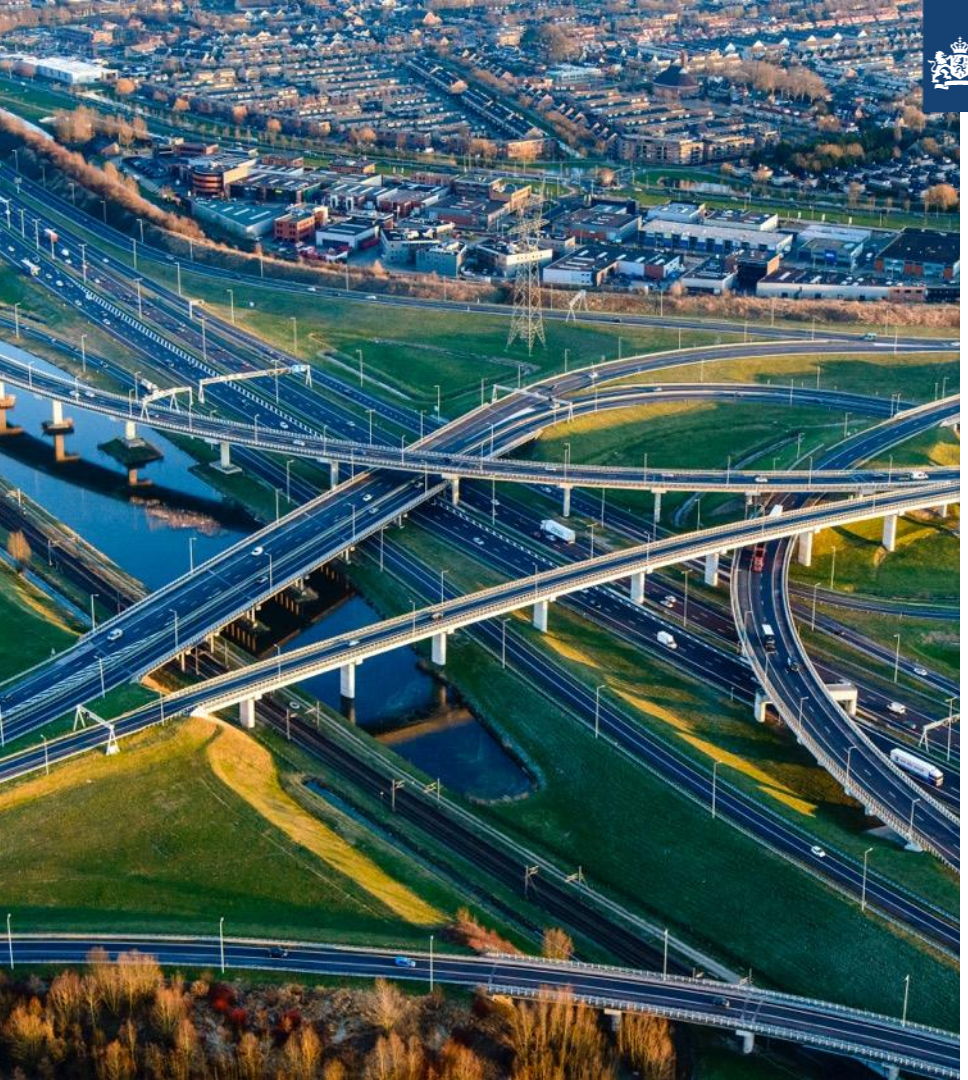
HMI, PLC, sensors & actuators

- Weak or default password
- Vulnerabilities
- Insecure (management) protocols

Conclusions & recommendations

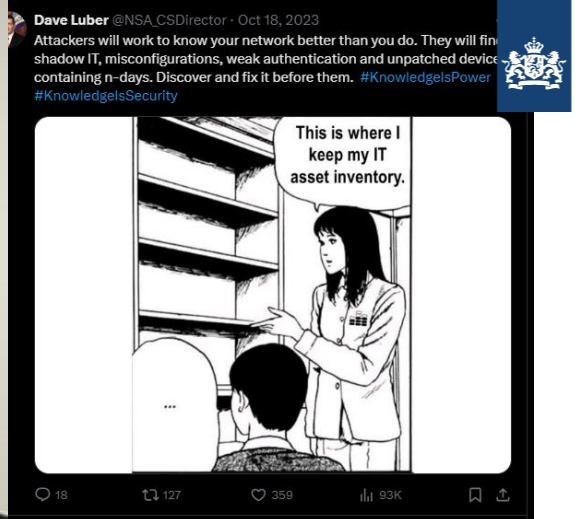
Conclusions

- There is still a lot of room for improving security of OT environments.
- Threat intel may help determine your risks and needed efforts.
- It is not hard, but it does require effort.



Recommendations

- Start with the quick wins (default passwords, improving the ruleset of your IT/OT firewall).
- Start an asset inventory
- Work together with your vendor to patch systems and improve hardening.
- Improve the network architecture (layered design, secure remote access).



But Nation states/APTs!?

- Adapt to the target.
- Will only use zero days if they have to.
- Invest time to know your systems and network inside out.
- The security measures on the previous slide also make them work hard.
- Don't believe me, watch this presentation: [USENIX Enigma 2016 - NSA TAO Chief on Disrupting Nation State Hackers - YouTube]


Questions?
https://www.ncsc.nl/
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