OT CYBERSECURITY

THE 2023 YEAR IN REVIEW

VULNERABILITY BRIEFING

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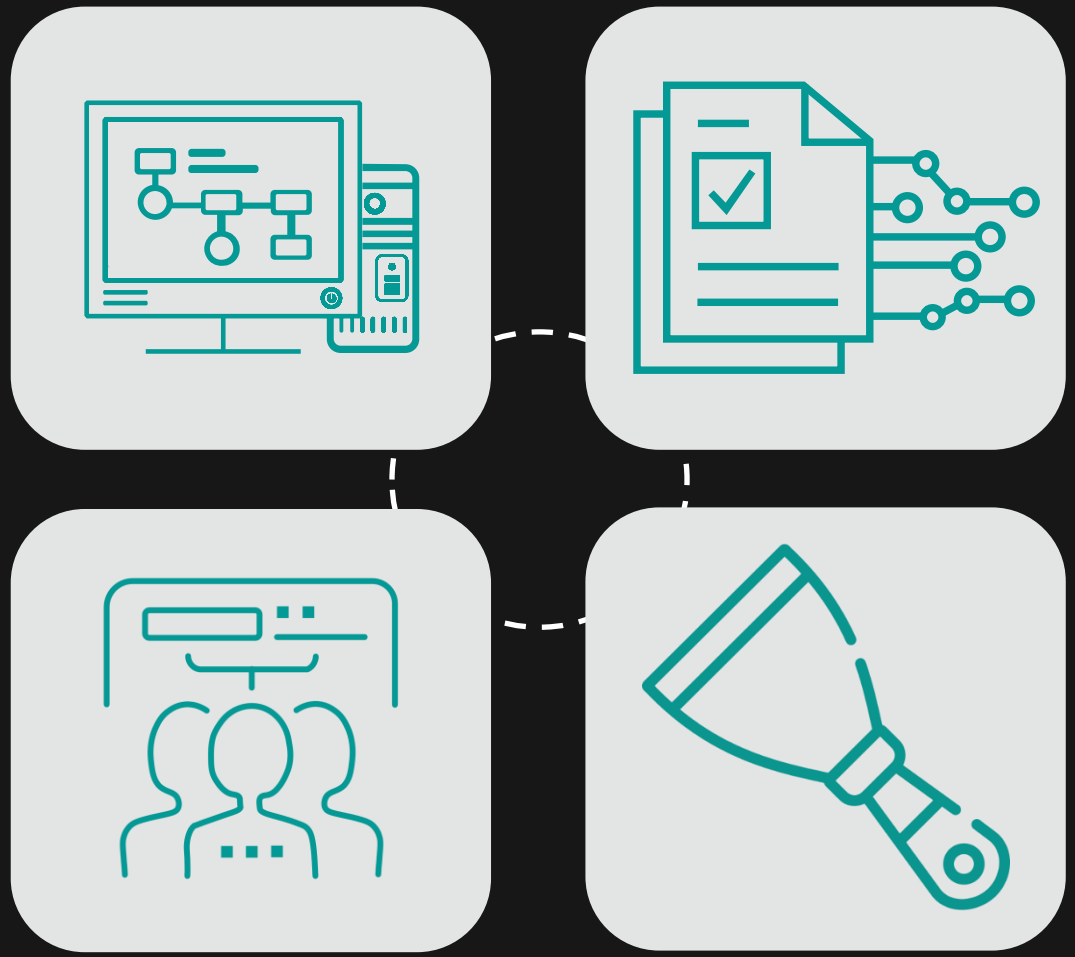
AGENDA

1. DRAGOS VULNERABILITY PROCESS
2. WHAT HAPPENED IN 2023?
3. NOTEWORTHY COMMON WEAKNESSES
4. PRIORITIZE NOW, NEXT, NEVER
5. FOCUS & FUTURE OUTLOOK
6. Q&A

Vulnerability Analysis Process & Impact

OBTAINING NEW VULNERABILITY DATA

Vendors, Public PSIRT Programs, Dragos Research, Government Advisories



Independent Researchers, Research Team/Companies, POCs

OT-CERT

In-House Scraper

VULNERABILITY ANALYSIS PROCESS

What is it?

Why does it matter?

What can we do about it?

- ✓ Assess individual CVEs
- ✓ Alternatives to patching
- ✓ CVSS corrections & prioritization
- ✓ OT-specific impacts

NOW

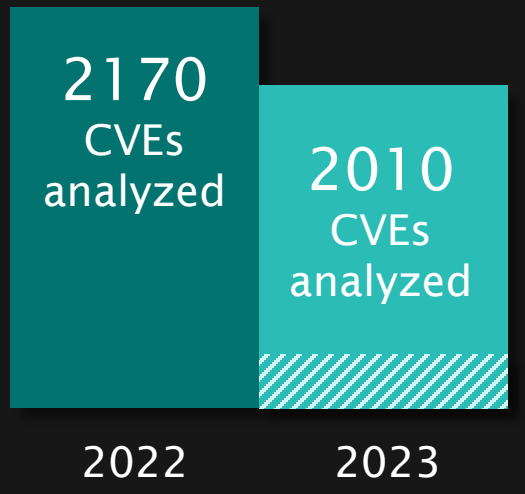
NEXT

NEVER

Vulnerability Stats 2023

HIGH-LEVEL OVERVIEW OF 2023

31% had incorrect CVSS data



14% had incorrect numeric scores, vectors, or both

Dragos provided missing mitigation advice for

49% of advisories

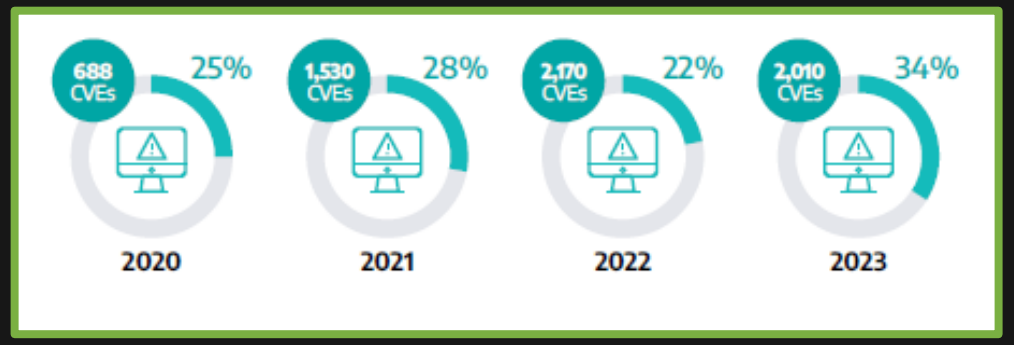
9% MORE SEVERE

4% less severe

1% were the same

RISE OF AUTHENTICATION REQUIRED VULNERABILITIES

VULNERABILITIES REQUIRING AUTHENTICATION TO EXPLOIT INCREASED ?



Potential reasons

- More Vendors are implementing authentication
- The low-hanging “No Auth” bugs have been mostly discovered.

Authentication does not equal secure

- Default credentials
- Backdoors
- Brute force / Credential theft

What Happened in 2023?

ROCKWELL AUTOMATION CONTROLLOGIX VULNERABILITIES

- US Gov disclosed vulnerabilities Rockwell Automation Devices after discovering zero-day vulns
- These issues were related to custom objects in Rockwell Automation CIP protocol
  - CVE-2023-3595 and CVE-2023-3596
- Rockwell Automation developed patches
- Multiple vendors were brought in to analyze vulns and detections

REAL TIME FEEDBACK FROM OT WATCH & NEIGHBORHOOD KEEPER

- Neighborhood Keeper participants and OT Watch Customers had visibility before the advisory went live
  - Allowed Dragos to identify issues with the provided detections and monitor for exploitation

TAKEAWAYS FROM OUR COLLABORATION

Neighborhood Keeper & OT Watch allow Dragos to quickly deploy analytics and IOCs for real-time feedback

Industry competitors can work together to safeguard civilization

Shoutout to Maggie Morganti from Rockwell Automation

HACKTIVIST ATTACKS ON UNITRONICS PLCs

In November 2023, CyberAv3ngers targeted Israeli-manufactured Unitronics PLCs

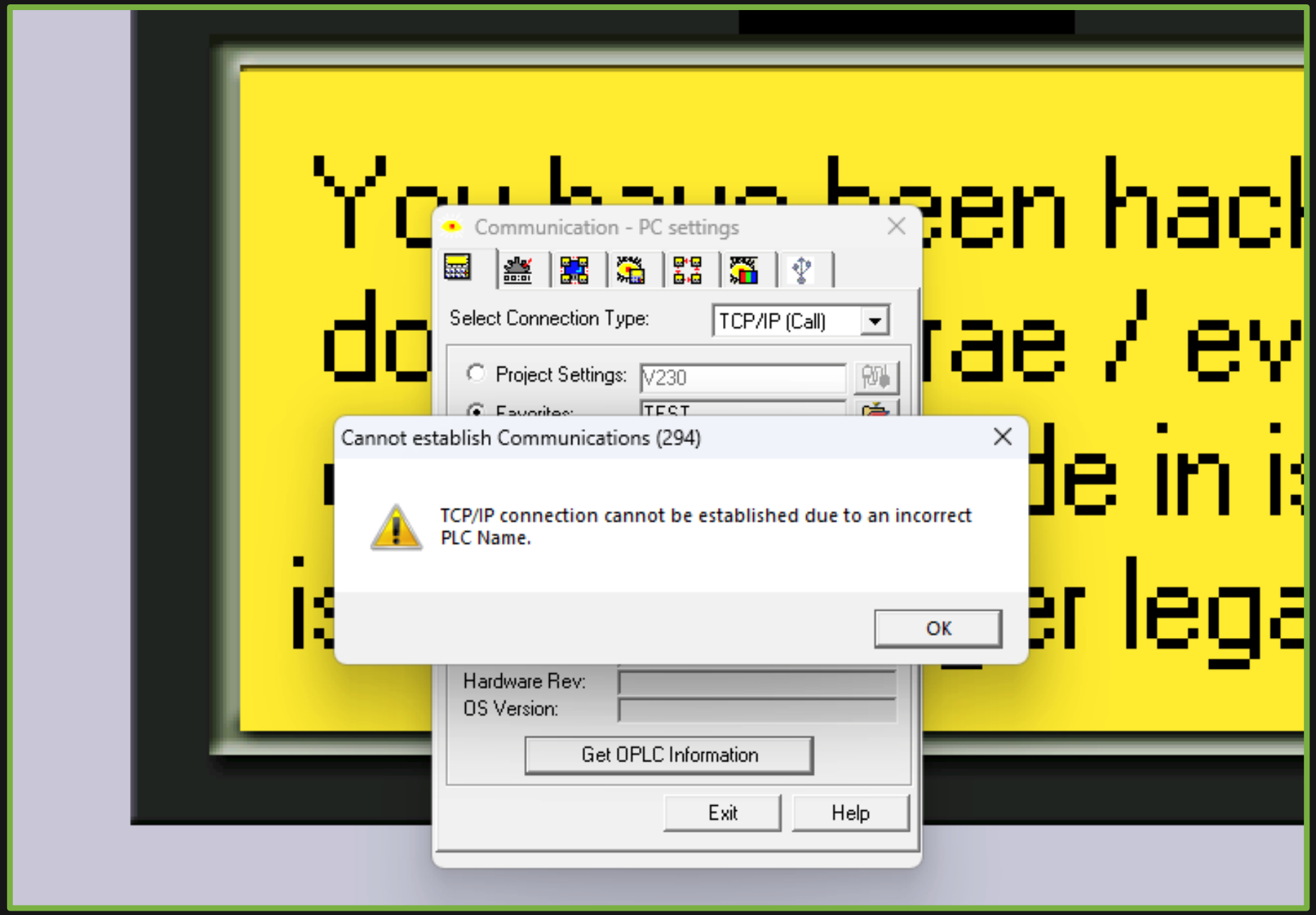
Targeted multiple sectors across the world

- Caused a local Water Scheme in North Ireland to go offline for two days
- Compromised a municipal water authority in Pittsylvania

Dragos analyzed a compromised PLC

UNITRONICS ROOT CAUSE

- Wiped ladder logic by sending blank ladder logic
  - This impacted operations
- Changed the PLCs name to #Gaza
  - Prevented the PLC management software from being able to connect to the PLC
  - You must know the PLC name to connect to the PLC
- Dragos assessed the password protection mechanisms
  - Three of the four available fail to prevent this type of attack
  - Password is retrievable


Communication - PC settings
Select Connection Type:
TCP/IP (Call)
Project Settings:
V230
Cannot establish Communications (294)
TCP/IP connection cannot be established due to an incorrect PLC Name.
OK
Hardware Rev:
OS Version:
Get OPLC Information
Exit
Help

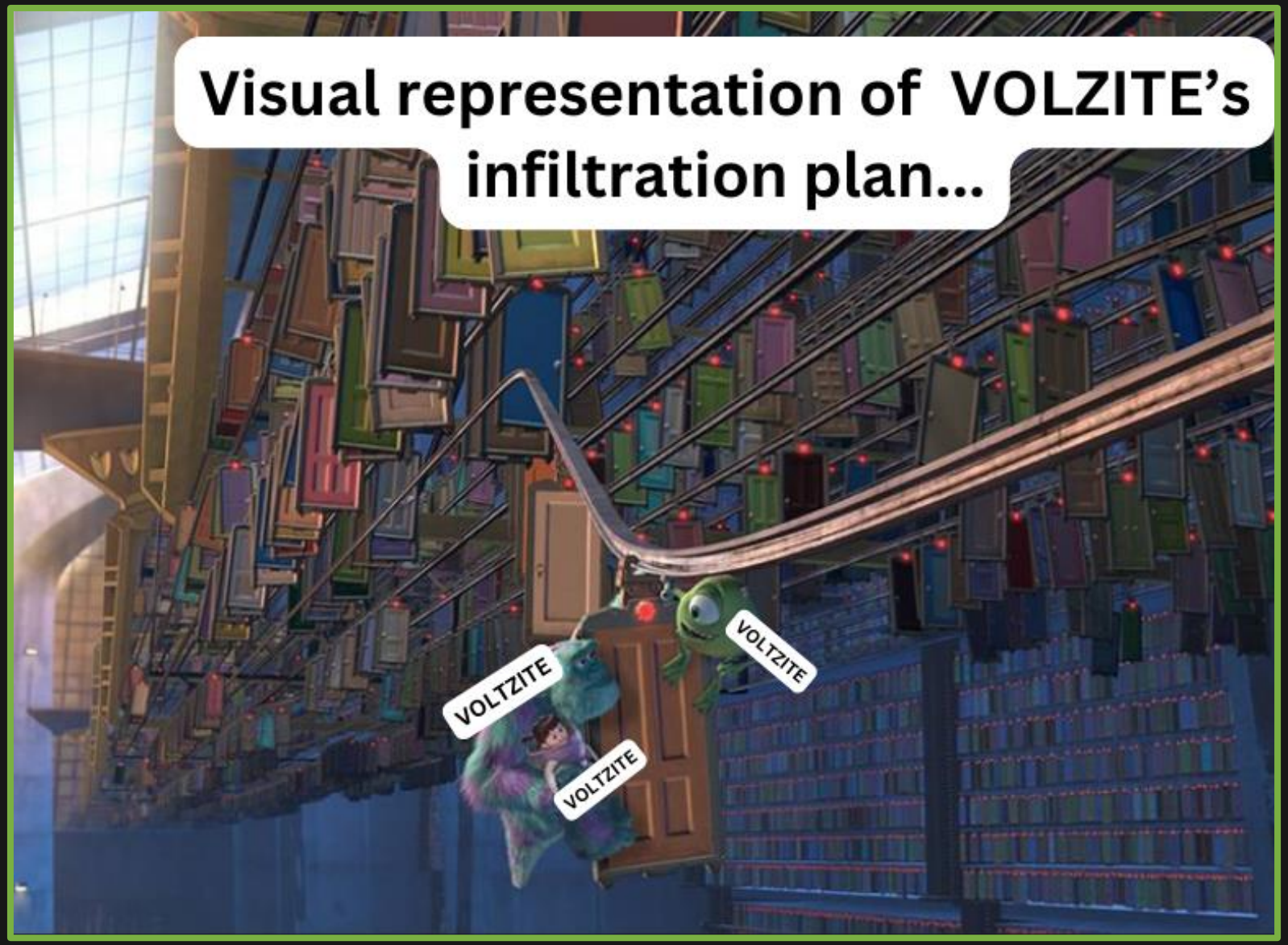
WHY THE ATTACKS ON UNITRONICS DEVICES MATTER?

THE PUBLIC GUIDANCE DOES NOT PREVENT EXPLOITATION

- There are still lots of unpatched devices connected to the internet
- CyberAv3ngers are still active and targeting vulnerable perimeter devices
- Dragos is still tracking their activity

VOLTZITE IVANTI ZERO-DAYS

- Abused by VOLTZITE aka Volt Typhoon
- Targets Ivanti Connect Secure VPN aka Pulse Secure
- CVE-2023-46805
  - Bypasses authentication
- CVE-2024-21887
  - Command injection vulnerabilities
  - Impacts multiple webserver endpoints
- Lots of implants, Lots of backdoors....


Visual representation of VOLZITE's infiltration plan...
VOLTZITE
VOLTZITE
VOLTZITE

Noteworthy CWEs

CWE VS CVE

This is the mistake.

CWE-20: Improper Input Validation

This is the vulnerability caused by the mistake.

CWE VS CVE

This is the mistake.

CWE-20: Improper Input Validation

This is the vulnerability caused by the mistake.

CWE-787/CWE-125: OUT-OF-BOUND READ/WRITE

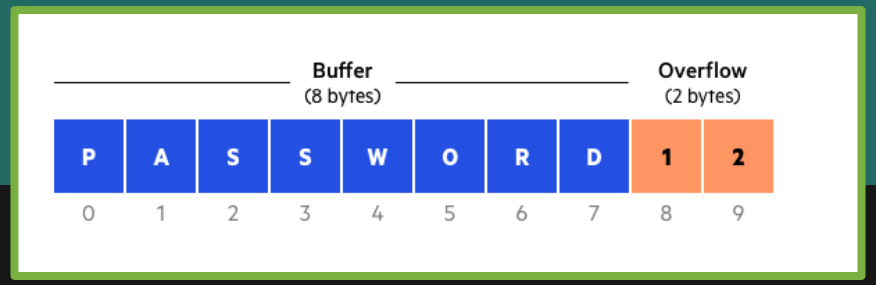
The most common CWE of last year

16% of all CVES assessed

Led in active exploitation

Over 40% are network exploitable

78% of these CVEs require no authentication



CWE-78: OS COMMAND INJECTION

- Second most exploited CWE
- Average CVE score of 9.2
- The highest among CWEs with more than one CVE
- The occurrence of these vulnerabilities has doubled over the past year
- 90% are remotely exploitable

Now, Next, Never

VULNERABILITY MANAGEMENT – PRIORITIZATION

A SMALL FRACTION OF VULNERABILITIES NEED IMMEDIATE ACTION

3%

OF ICS/OT VULNERABILITIES NEEDED TO BE ADDRESSED

NOW

68%

are network exploitable but addressing these can wait until the next maintenance cycle

These need to be addressed

NEXT

Mitigate through network monitoring, segmentation & MFA

29%

pose a possible threat but rarely require action

They likely NEVER need to be addressed

NEVER

Monitor these for signs of exploitation

ADDRESSING VULNERABILITIES NOW, NEXT, NEVER

NOW

- Actively exploited, public PoCs, disrupts OT environments
- Look into this right away

NEXT

- Network exploitable, but can be mitigated through network segmentation
- Look into this next and if there is time and resources

NEVER

- Complicated to exploit, require physical access, no impact to the OT environment
- No actions required, likely a waste of time

Focus Topics

FOCUS TOPIC: BUILDING TRUST WITH PRODUCT VENDORS

Understanding Sensitivity

- Vulnerability details can be sensitive.

Final Review

- Giving vendors final review of public content.

Perspective

- A Vulnerability is not the "end of the world.“

No fear Dragos is here

FOCUS TOPIC: PRODUCT VENDOR WINS!

Rockwell Automation

- Cross-vendor collaboration to get ahead of the adversary

Omron

- Very open-minded, responsive, and helpful in disclosing vulnerabilities that Dragos publicly disclosed

Phoenix Contact

- Dragos discovered vulns in their PLCNext runtime
- They sent Dragos newer loaner hardware to test our findings

Please, never hesitate to reach out!
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Future Outlook

WHAT TO EXPECT IN 2024

- Deep dives by our Vulnerability team
- More IoT/IIOT assessments
- Windows and Cisco Vulnerability coverage in Platform
- S4 Presentation by Logan Carpenter will be public later this year

QUESTIONS AND ANSWERS

ENHANCE YOUR OT THREAT PREPAREDNESS.

Download the Report:
dragos.com/year-in-review