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CANADIAN CENTRE FOR CYBER SECURITY

NATIONAL CYBER THREAT ASSESSMENT

2025
2026

Communications Security Establishment Canada
Canadian Centre for Cyber Security
Centre de la sécurité des télécommunications Canada
Centre canadien pour la cybersécurité

Canada

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About the Cyber Centre

The Canadian Centre for Cyber Security (Cyber Centre) is Canada's technical authority on cyber security. Part of the Communications Security Establishment Canada (CSE), we are the single unified source of expert advice, guidance, services, and support on cyber security for Canadians and Canadian organizations.

The Cyber Centre works in close collaboration with Government of Canada departments, critical infrastructure, Canadian businesses, and international partners to prepare for, respond to, mitigate, and recover from cyber events. The Cyber Centre is outward-facing, welcoming partnerships that help build a stronger, more resilient cyberspace in Canada. In line with the National Cyber Security Strategy, the Cyber Centre represents a more cooperative approach to cyber security in our country.

As trusted experts in cyber security, we help keep Canada and Canadians safe by:

- being a clear, trusted source of relevant cyber security information for Canadians, Canadian businesses, and critical infrastructure owners and operators
- providing tailored cyber security advice and guidance to protect the country's most important cyber systems
- working side by side with provincial, territorial, municipal, and Indigenous governments, and private sector partners to solve Canada's most complex cyber challenges
- developing and sharing our specialized cyber defence technology and knowledge
- defending cyber systems, including Government of Canada networks, by developing and deploying sophisticated cyber defence tools and technology
- leading the Government of Canada's operational response during cyber events by using our expertise and access to provide information immediately useful for managing incidents

Through our work and partnerships, we help raise Canada's cyber security bar so Canadians can live and work online safely and with confidence.

Minister's foreword

Cyber threats to Canada are becoming more complex and sophisticated, threatening our national security and economic prosperity. As a nation with a significant global presence, Canada is a valuable target for cybercriminals looking to make a profit and state adversaries aiming to disrupt the systems we rely on.

In the last two years, we have witnessed a sharp increase in both the number and severity of cyber incidents, many of which target our essential services. Actors outside our borders have also attempted to influence public opinion and intimidate our population, including in the Canadian diaspora, through coordinated cyber campaigns.

The Canadian Centre for Cyber Security's National Cyber Threat Assessment 2025-2026 is an instrumental tool in our comprehension of cyber threats to Canada. The threat assessment draws on public reporting and classified intelligence to paint an overall picture of the current threat landscape, while also forecasting future trends. By offering reliable and timely information, the report empowers Canadian organizations and individuals to prepare for and defend against current and emerging threats.

Deepening our understanding of cyber threats enables us to enhance our readiness and, as threats evolve, the Cyber Centre will continue to look for new ways to combat them. Its team is at the forefront of enhancing our cyber security to protect Canadians. Our government is supporting their invaluable work and Budget 2024 allocates $917.4 million to enhance intelligence and cyber operations programs to respond to evolving national security threats.

The insights provided in this threat assessment are critical as we work to strengthen Canada's security in an increasingly digital world.

The Honourable Bill Blair
Minister of National Defence

Message from the Head of the Cyber Centre

It's hard to believe it's already been two years since our last report. At first glance, it seems that the cyber threat environment hasn't changed much. Cybercrime remains a persistent threat, ransomware attacks continue to target our critical infrastructure, and state-sponsored cyber threat activity is still affecting Canadians.

What has changed, however, is that state adversaries are getting bolder and more aggressive. Cybercriminals driven by profit are increasingly benefiting from new illicit business models to access malicious tools and are using artificial intelligence to enhance their capabilities. Non-state actors are seizing on major global conflicts and political controversies to carry out disruptive activities.

These new developments and other trends are outlined in detail in this edition of the National Cyber Threat Assessment. This year's report goes further than previous editions, offering more tangible examples of cyber threat activity in Canada and around the world, as well as providing some of our own statistics on cyber incidents.

While our assessments describe trends that should concern anyone who reads about them, you can rest assured that the Cyber Centre remains focused on tackling these threats. Working in close collaboration with the private sector, industry, government and critical infrastructure, we're helping to protect the systems that are vital to our daily lives.

Whether you're a first-time reader or an avid consumer, an individual Canadian or a member of a small, medium or large organization, I'm confident that you will find the information in this report insightful. I hope that it also encourages you to reflect on what you can do to contribute to our collective resilience. After all, we all have a role to play in building a safer, more secure Canada.

Sincerely,

Rajiv Gupta
Head, Canadian Centre for Cyber Security

Executive summary

Canada is confronting an expanding and complex cyber threat landscape with a growing cast of malicious and unpredictable state and non-state cyber threat actors, from cybercriminals to hacktivists, that are targeting our critical infrastructure and endangering our national security. These cyber threat actors are evolving their tradecraft, adopting new technologies, and collaborating in an attempt to improve and amplify their malicious activities.

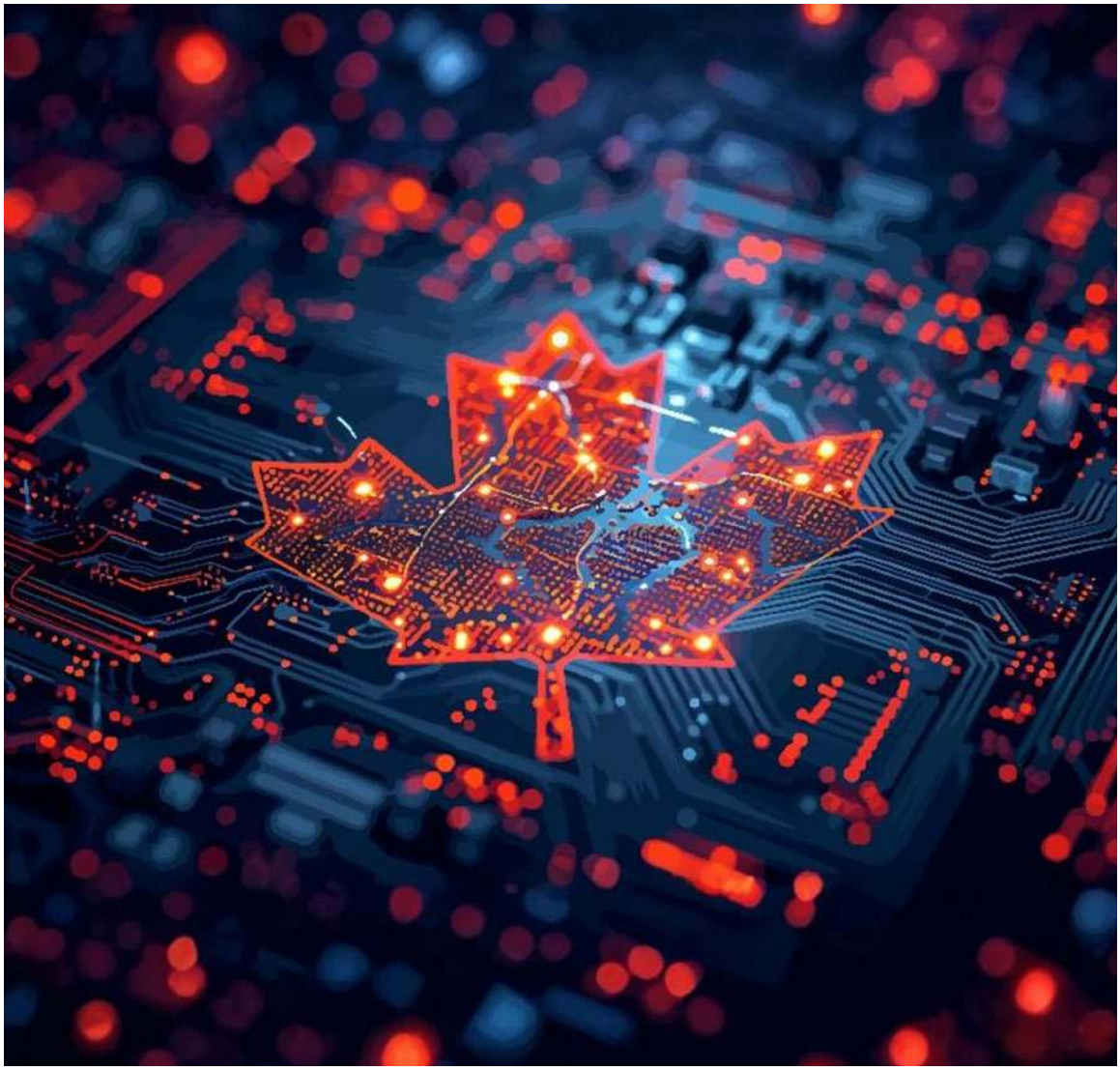
Canada's state adversaries are becoming more aggressive in cyberspace. State-sponsored cyber operations against Canada and our allies almost certainly extend beyond espionage. State-sponsored cyber threat actors are almost certainly attempting to cause disruptive effects, such as denying service, deleting or leaking data, and manipulating industrial control systems, to support military objectives and/or information campaigns. We assess that our adversaries very likely consider civilian critical infrastructure to be a legitimate target for cyber sabotage in the event of a military conflict.

At the same time, cybercrime remains a persistent, widespread, and disruptive threat to individuals, organizations, and all levels of government across Canada that is sustained by a thriving and resilient global cybercrime ecosystem. We assess that the financial motivations underpinning cybercrime will almost certainly drive the cybercrime ecosystem to continuously evolve and diversify as cybercriminals attempt to evade authorities.

Key judgements

- **Canada's state adversaries are using cyber operations to disrupt and divide.** State-sponsored cyber threat actors are almost certainly combining disruptive computer network attacks with online information campaigns to intimidate and shape public opinion. State-sponsored cyber threat actors are very likely targeting critical infrastructure networks in Canada and allied countries to pre-position for possible future disruptive or destructive cyber operations.
- **The People's Republic of China's (PRC) expansive and aggressive cyber program presents the most sophisticated and active state cyber threat to Canada today.** The PRC conducts cyber operations against Canadian interests to serve high-level political and commercial objectives, including espionage, intellectual property (IP) theft, malign influence, and transnational repression. Among our adversaries, the PRC cyber program's scale, tradecraft, and ambitions in cyberspace are second to none.
- **Russia's cyber program furthers Moscow's ambitions to confront and destabilize Canada and our allies.** Canada is very likely a valuable espionage target for Russian state-sponsored cyber threat actors, including through supply chain compromises, given Canada's membership in the North Atlantic Treaty Organization, support for Ukraine against Russian aggression, and presence in the Arctic. Pro-Russia non-state actors, some of which we assess likely have links to the Russian government, are targeting Canada in an attempt to influence our foreign policy.

- **Iran uses its cyber program to coerce, harass, and repress its opponents, while managing escalation risks.** Iran's increasing willingness to conduct disruptive cyber attacks beyond the Middle East and its persistent efforts to track and monitor regime opponents through cyberspace present a growing cyber security challenge for Canada and our allies.
- **The Cybercrime-as-a-Service (CaaS) business model is almost certainly contributing to the continued resilience of cybercrime in Canada and around the world.** The CaaS ecosystem is underpinned by flourishing online marketplaces where specialized cyber threat actors sell stolen and leaked data and ready-to-use malicious tools to other cybercriminals. This has almost certainly enabled a growing number of actors with a range of capabilities and expertise to carry out cybercrime attacks and evade law enforcement detection.
- **Ransomware is the top cybercrime threat facing Canada's critical infrastructure.** Ransomware directly disrupts critical infrastructure entities' ability to deliver critical services, which can put the physical and emotional wellbeing of victims in jeopardy. In the next two years, ransomware actors will almost certainly escalate their extortion tactics and refine their capabilities to increase pressure on victims to pay ransoms and evade law enforcement detection.



About this threat assessment

The National Cyber Threat Assessment 2025-2026 (NCTA 2025-2026) highlights the cyber threats facing individuals and organizations in Canada. It provides an update to the National Cyber Threat Assessment 2018[1] (NCTA 2018), the National Cyber Threat Assessment 2020[2] (NCTA 2020), and the National Cyber Threat Assessment 2023-2024[3] (NCTA 2023-2024), with analysis of the interim years and forecasts until 2026. We recommend reading the NCTA 2025-2026 along with the Introduction to the Cyber Threat Environment[4] and the advice and guidance that we have released as companions to this assessment.

We prepared this assessment to help Canadians shape and sustain our nation's cyber resilience. It is only when the government, the private sector, and the public work together that we can build resilience to cyber threats in Canada.

Sources

The key judgements in this assessment rely on reporting from multiple sources, both classified and unclassified. The judgements are based on CSE's knowledge and expertise in cyber security. Defending the Government of Canada's information systems provides CSE with a unique perspective to observe trends in the cyber threat environment, which also informs our assessment. CSE's foreign intelligence mandate provides us with valuable insights into adversary behaviour in cyberspace. While we must always protect classified sources and methods, we provide the reader with as much justification as possible for our judgements.

Assessment process

Our cyber threat assessments are based on an assessment methodology that includes evaluating the quality of available information, exploring alternative explanations, mitigating biases, and using probabilistic language. We use the terms "we assess" or "we judge" to convey an analytic assessment. We use qualifiers such as "possibly," "likely," and "very likely" to convey probability.

This threat assessment is based on information available as of **September 20, 2024**.

Limitations

This assessment does not provide an exhaustive list of all cyber threat activity in Canada or mitigation advice. The purpose of this threat assessment is to describe and evaluate the threats facing Canada. We focus on understanding the current cyber threat environment and how threat activity can affect Canadians and Canadian organizations. Cyber security guidance can be found on the Cyber Centre website and on the Get Cyber Safe website.[5]

Estimative language

The chart below matches estimative language with appropriate percentages. These percentages are not derived via statistical analysis, but are based on logic, available information, prior judgements, and methods that increase the accuracy of estimates.

Introduction

Canada has entered a new era of cyber vulnerability where cyber threats are ever-present, and Canadians will increasingly feel the impact of cyber incidents that have cascading and disruptive effects on their daily lives.

Advancements in communications and computing technologies have ushered in a world of ubiquitous connectivity for Canadians. In this environment, online platforms and digital technologies continue to shape and mediate Canadians' interactions with the physical world—the way we work, shop, travel, socialize, get informed, and access critical services.[6] These systems record and process vast amounts of data about us, often over poorly secured or untrustworthy digital networks.[7] These systems are also interconnected and fragile: cyber incidents, from cyber attacks to flawed software updates, can knock airlines, hospitals, banks, and retailers around the world offline.[8]

CSE and its partners in Canada and across the Five Eyes are attuned to the cyber threats to Canada from state and non-state cyber threat actors and are tracking them as they evolve. NCTA 2025-2026 provides the Canadian public with CSE's current insights on the state and non-state cyber threat actors conducting malicious cyber threat activity against Canada and how we assess the cyber threat landscape will evolve in the next two years. This assessment is divided into three sections that are designed to stand independently and together.

- **Section 1—Cyber threat from state adversaries:** introduces the state cyber threat ecosystem and discusses the cyber threats to Canada from
  - the People's Republic of China (PRC)
  - the Russian Federation (Russia)
  - the Islamic Republic of Iran (Iran)
  - the Democratic People's Republic of Korea (DPRK)
  - the Republic of India (India)
- **Section 2—Cybercrime threats:** discusses the interconnectivity of the Cybercrime-as-a-Service (CaaS) ecosystem and the cybercrime threats facing Canada, specifically from fraud, scams, and ransomware. This section also highlights the ransomware threat to Canada's critical infrastructure.
- **Section 3—Trends shaping Canada's cyber threat landscape:** identifies five trends that will shape Canada's cyber threat landscape and drive cyber threat activity impacting Canadians up to 2026.

Readers interested in more detailed information on the evolving cyber threat landscape, including definitions of important terms and concepts referenced in this NCTA, are invited to consult the following:

- An Introduction to the Cyber Threat Environment[9]
- Cyber Threats to Canada's Democratic Process: 2023 update[10]
- The threat from large language model text generators[11]

CYBER THREAT FROM **STATE ADVERSARIES**

Canada is confronting an expanding and more complex state cyber ecosystem

Strategic adversaries

The cyber programs of the PRC, Russia, and Iran remain the greatest strategic cyber threats to Canada. These countries are united in their desire to challenge United States (U.S.) dominance in multiple domains, including cyberspace, and promote an authoritarian vision for Internet governance and domestic surveillance.[12] The PRC's cyber program surpasses other hostile states in both the scope and resources dedicated to cyber threat activity against Canada.

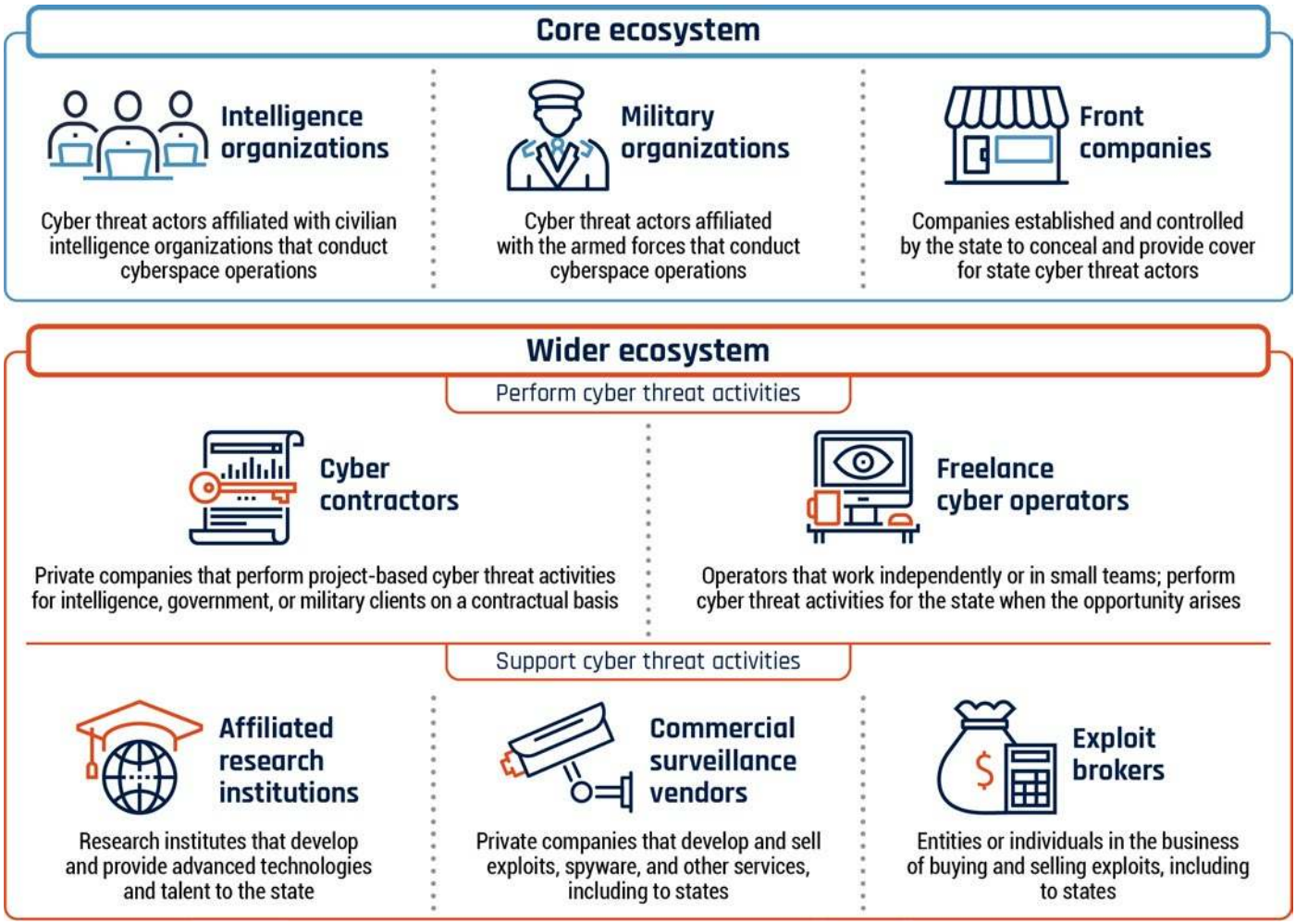
Emerging cyber programs

At the same time, countries that aspire to become new centres of power within the global system, such as India, are building cyber programs that present varying levels of threat to Canada.[13] While emerging states focus their cyber efforts on domestic threats and regional rivals, they also use their cyber capabilities to track and surveil activists and dissidents living abroad.

Wider cyber ecosystem

Both advanced and emerging states are leveraging a complex ecosystem of commercial surveillance vendors, contractors, and affiliated research institutions to support or perform cyber threat activities (Figure 1).[14] States use these entities to mask their cyber operations or to acquire exploits, digital infrastructure, and data. Emerging states are very likely using the wider ecosystem to try and move up the ladder of sophistication and acquire capabilities that may be beyond their capacity to develop internally.

Figure 1: State cyber program ecosystem[15]



People's Republic of China

The PRC presents the most sophisticated and active cyber threat to Canada

The PRC's expansive and aggressive cyber program has global cyber surveillance, espionage, and attack capabilities and is the most comprehensive cyber security threat facing Canada today. Canada, along with our Five Eyes partners, is an ongoing target for the PRC's cyber program. The PRC conducts cyber operations against Canadian interests to serve high-level political and commercial objectives, including espionage, IP theft, malign influence, and transnational repression. Among our adversaries, the PRC cyber program's scale, tradecraft, and ambitions in cyberspace are second to none.

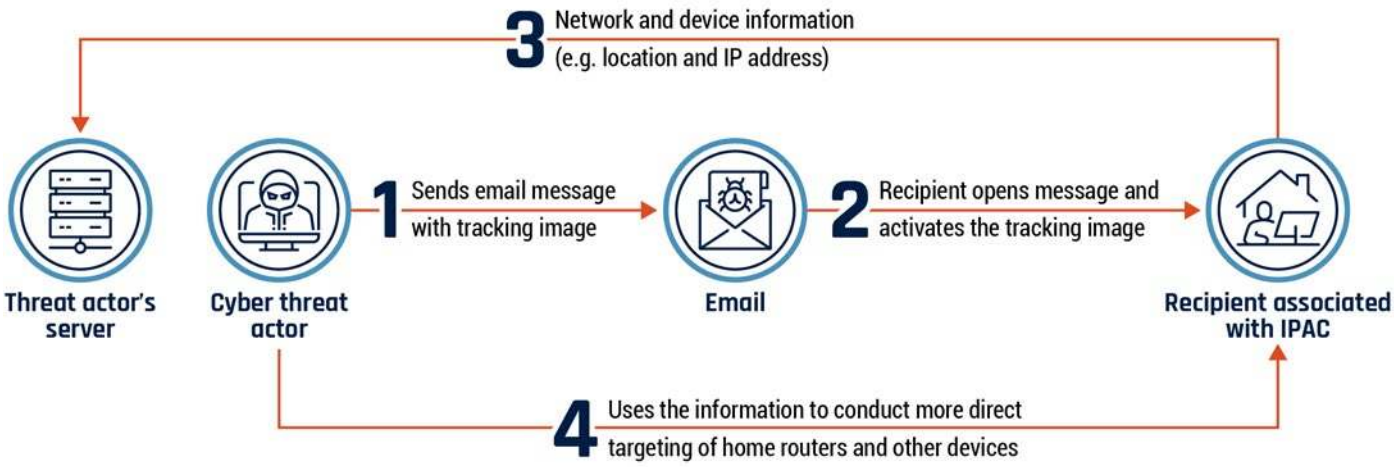
The PRC targets all levels of government and public officials for valuable intelligence

PRC state-sponsored cyber threat actors persistently conduct cyber espionage against federal, provincial, territorial, municipal, and Indigenous government networks in Canada. PRC cyber threat actors have compromised and maintained access to multiple government networks over the past five years, collecting communications and other valuable information.[16] While all known federal government compromises have been resolved, it is very likely that the actors responsible for these intrusions dedicated significant time and resources to learn about the target networks.

Over the past four years, at least 20 networks associated with Government of Canada agencies and departments have been compromised by PRC cyber threat actors.

PRC state-sponsored cyber threat actors also target Canadian government officials, particularly individuals that the PRC perceives as being critical of the Chinese Communist Party (CCP). According to a U.S. Department of Justice indictment, in 2021, PRC state-sponsored cyber threat actors targeted members of the Inter-Parliamentary Alliance on China (IPAC), a group of global lawmakers whose stated purpose is to counter the threats posed by the CCP to the international order and democratic principles. The threat actors sent email messages with tracking images to recipients to conduct network reconnaissance (see Figure 2).[17] A number of Canadian politicians who are members of IPAC have come forward to confirm that they were targeted in this operation.[18]

Figure 2: PRC email operation against members of Inter-Parliamentary Alliance on China



The PRC targets Canadian government networks and public officials to acquire information that will advance its strategic, economic, and diplomatic interests, and give the PRC government an advantage in China-Canada bilateral relations and commercial matters. For example, provincial and territorial governments are likely a valuable target given that they have decision-making power over regional trade and commerce, including resource extraction (e.g., energy and critical minerals).[19] In addition to fulfilling PRC intelligence collection priorities, the information collected is also likely used to support the PRC's malign influence and interference activities against Canada's democratic processes and institutions.

PRC cyber threat activity against Canada appears to intensify following events that increase bilateral tensions between Canada and the PRC. In this context, PRC cyber threat activity is likely designed to gather timely intelligence on official reactions and to monitor unfolding developments.

PRC cyber-enabled transnational repression targets individuals in Canada

PRC cyber threat actors very likely support China's actions abroad designed to silence activists, journalists, diaspora communities, and other groups that the PRC views as security threats. These groups, collectively referred to by PRC officials as the "Five Poisons," include:

- Falun Gong practitioners
- Uyghurs
- Tibetans
- supporters of Taiwanese independence
- pro-democracy activists

PRC actors very likely facilitate transnational repression by monitoring and harassing these groups online and tracking them using cyber surveillance.[20] For example, the PRC has been publicly linked to cyber espionage operations against the Uyghur minority group, including members living in Canada, using spear phishing emails and spyware.[21]

The PRC government very likely leverages Chinese-owned technology platforms, some of which likely cooperate with the PRC's intelligence and security services, to facilitate transnational repression.[22]

The PRC targets Canada's private sector and innovation ecosystem for competitive advantage

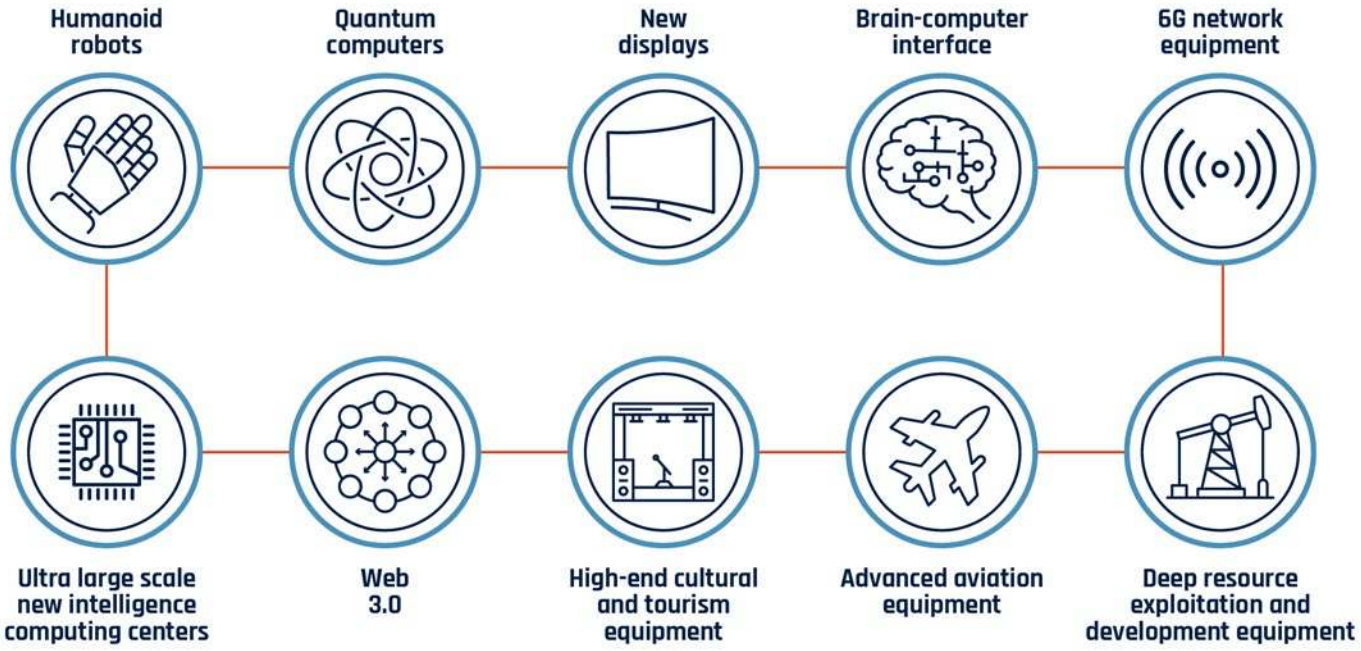
Canada's innovation ecosystem has been a long-standing priority of PRC intelligence collection. The PRC cyber program almost certainly continues to support the PRC's espionage activities against Canada's private sector, academia, supply chains, and government-affiliated research and development (R&D). PRC cyber threat actors have very likely stolen commercially sensitive data from Canadian firms and institutions.

The PRC uses cyber contractors and freelancers to support espionage

The PRC uses a competitive marketplace of contract and freelance cyber actors to support the PRC's intelligence collection requirements. For example, I-Soon is a PRC-based private contractor that provides "hacker-for-hire" services. According to leaked documents, the company worked on projects on a contractual basis for various PRC government and military entities and state-owned enterprises. I-Soon reportedly sold exfiltrated data from targets to its clients.[23]

PRC cyber threat actors targeting Canada likely prioritize collecting confidential and proprietary information that supports the PRC's economic and military interests and that can help accelerate the PRC's development of advanced and strategic technologies (Figure 3). The PRC will likely intensify its espionage activities against Canada's innovation sector as economic tensions between the PRC and Canada (and our allies) rise.[24]

Figure 3: Future industries "iconic products" identified as priorities for PRC industrial policy (2024)[25]



PRC pre-positioning within United States critical infrastructure increases risk to Canada

In a strategic shift, the PRC is very likely integrating offensive cyber operations into its military planning to gain an advantage during a potential conflict with the U.S. PRC state-sponsored cyber threat actors, tracked as Volt Typhoon, are almost certainly seeking to pre-position within U.S. critical infrastructure networks for disruptive or destructive cyber attacks in the event of a major crisis or conflict with the U.S. According to U.S. officials, the PRC's operation is designed to slow the U.S. military's response and to sow societal panic.[26] Volt Typhoon is especially noteworthy because the PRC has not historically conducted disruptive or destructive cyber operations against critical infrastructure.[27]

We assess that the direct threat to Canada's critical infrastructure from PRC state-sponsored cyber threat actors is likely lower than that to U.S. infrastructure. While the focus of future PRC cyber warfare operations will likely be concentrated on the U.S., disruptive or destructive cyber threat activity against integrated North American critical infrastructure, such as pipelines, power grids, and rail lines, would likely affect Canada as well due to cross-border interoperability and interdependence.[28]

Russian Federation

Russia is leveraging its cyber program to confront the West

Russia's unpredictable cyber program routinely challenges existing norms in cyberspace and furthers Moscow's ambitions to confront and destabilize Canada and our allies.

Russia almost certainly views its cyber program as part of a multi-layered strategy to influence and shape the information environment. Russia combines conventional cyber espionage and computer network attacks with disinformation and influence operations to:[29]

- promote Russia's global status and reinforce pro-Russia narratives
- erode trust in democratic institutions
- generate popular support for Russia's war efforts, both at home and abroad
- psychologically weaken or embarrass its opponents

Russia's cyber threat activities are supported by a network of state and non-state cyber actors, including an ever-shifting group of Russia-nexus cybercriminals, hacktivists, and "hackers-for-hire" who are likely motivated by a mix of patriotism, profit, or opportunism. This hybrid strategy, which provides Russia with deniability, appears to have been emulated by other states, creating a more complex cyber threat environment for Canada and our allies.[30]

Russian cyber threat actor conducts destructive cyber attack against Ukraine for psychological effects

In December 2023, a Russian cyber threat actor conducted a destructive wiper cyber attack against the Ukrainian telecom company Kyivstar, leaving millions of Ukrainians without Internet and mobile service for days. The cyber threat actor was reportedly in Kyivstar's systems since at least May 2023 and may have been able to steal subscriber information and intercept SMS messages. The actor claimed credit for the attack in a Telegram post addressed to Ukrainian President Volodymyr Zelenskyy. According to Ukrainian officials, the aim of the destructive attack was to land a psychological blow against Ukraine.[31]

Russia targets Canada for espionage

Canada is very likely a valuable espionage target for Russian state-sponsored cyber threat actors given Canada's membership in the North Atlantic Treaty Organization, support for Ukraine, and presence in the Arctic. Russian cyber threat actors are very likely targeting Canadian government, military, private sector, and critical infrastructure networks as part of Russia's foreign and military intelligence collection operations.[32]

Public and private sector organizations in Canada are also vulnerable to global supply chain compromises by Russian cyber threat actors. For example, in 2020, Russian state-sponsored cyber threat actors compromised the supply-chain by implanting malware into a SolarWinds software update.[33] Russian-state-sponsored cyber threat actors are almost certainly targeting cloud-based services with large numbers of customers in Canada.[34]

Russian cyber threat actors compromise Microsoft corporate email system for espionage

In January 2024, Microsoft detected that a Russian state-sponsored cyber threat actor publicly tracked by Microsoft as Midnight Blizzard had breached Microsoft's cloud-based enterprise email service. Midnight Blizzard accessed Microsoft's own corporate email accounts, exfiltrating correspondences between Microsoft and government officials in Canada, the U.S., and the United Kingdom.[35] According to Microsoft, the Russian cyber threat actor was initially seeking information about itself.[36] The threat actor later used personal data and credentials in the emails to attempt to gain access to Microsoft customer systems.

Pro-Russia non-state cyber threat actors target Canada to influence our foreign policy

Following Russia's invasion of Ukraine in 2022, pro-Russia non-state (PRNS) cyber threat actors, some of which we assess likely have links to the Russian government and intelligence services, have almost certainly conducted disruptive cyber threat activity against Canada and leveraged social media to draw attention to these attacks (Figure 4).[37] We assess that the intent of these campaigns is very likely to influence and undermine Canada's support for Ukraine. For example, a distributed denial of service (DDoS) attack campaign in April 2023 by PRNS actors against Government of Canada and Canadian private sector websites coincided with the Ukrainian Prime Minister's visit to Canada.[38]

Although PRNS cyber threat activity against Canada has primarily consisted of DDoS attacks and website defacements, some PRNS actors have attempted to compromise operational technology (OT) systems within critical infrastructure in North America and Europe with the intent to disrupt those systems. This activity opportunistically targets Internet-accessible devices and exploits basic vulnerabilities, such as insecure remote access software or the use of default passwords.[39] For example, in January 2024, a PRNS group claimed responsibility for the overflow of water storage tanks at water facilities in Texas. The group reportedly posted a video of the compromise and manipulation of control systems at each facility on a public forum.[40]

We assess that PRNS actors will likely attempt to disrupt vulnerable Internet-connected OT systems within Canadian critical infrastructure when the opportunity arises. PRNS cyber threat activity against OT may cause systems to malfunction, leading to damage or destruction of those systems and possible harm to public safety.

Figure 4: Notable examples of pro-Russia non-state cyber threat activity against Canada (2023)[41]

February 2023

Pro-Russia non-state cyber groups participate in a cyber campaign attempting to sabotage critical infrastructure in countries providing assistance to Ukraine, including Canada.

April 2023

Pro-Russia non-state cyber group claims responsibility for DDoS campaign against Canadian websites, including the Prime Minister's Office's public-facing website.

September 2023

Pro-Russia non-state cyber group claims responsibility for a DDoS campaign against Canadian websites, including Quebec provincial government websites.

Islamic Republic of Iran

Iran is expanding its disruptive cyber threat activity against the West

Iran has an aggressive cyber program that the regime uses to coerce, harass, and repress Iran's opponents, while managing escalation risks. Iran's increasing willingness to conduct disruptive cyber attacks beyond the Middle East, and its persistent efforts to track and monitor regime opponents through cyberspace present a growing cyber security challenge for Canada and our allies.

Iran has taken advantage of its back-and-forth cyber confrontation with Israel to improve its cyber espionage and offensive cyber capabilities and hone its information campaigns, which it is now almost certainly deploying against targets in the West.[42] While it is unlikely that Canada is, at present, a priority target of Iran's cyber program, Iranian cyber threat actors likely have access to computer networks in Canada, including critical infrastructure.

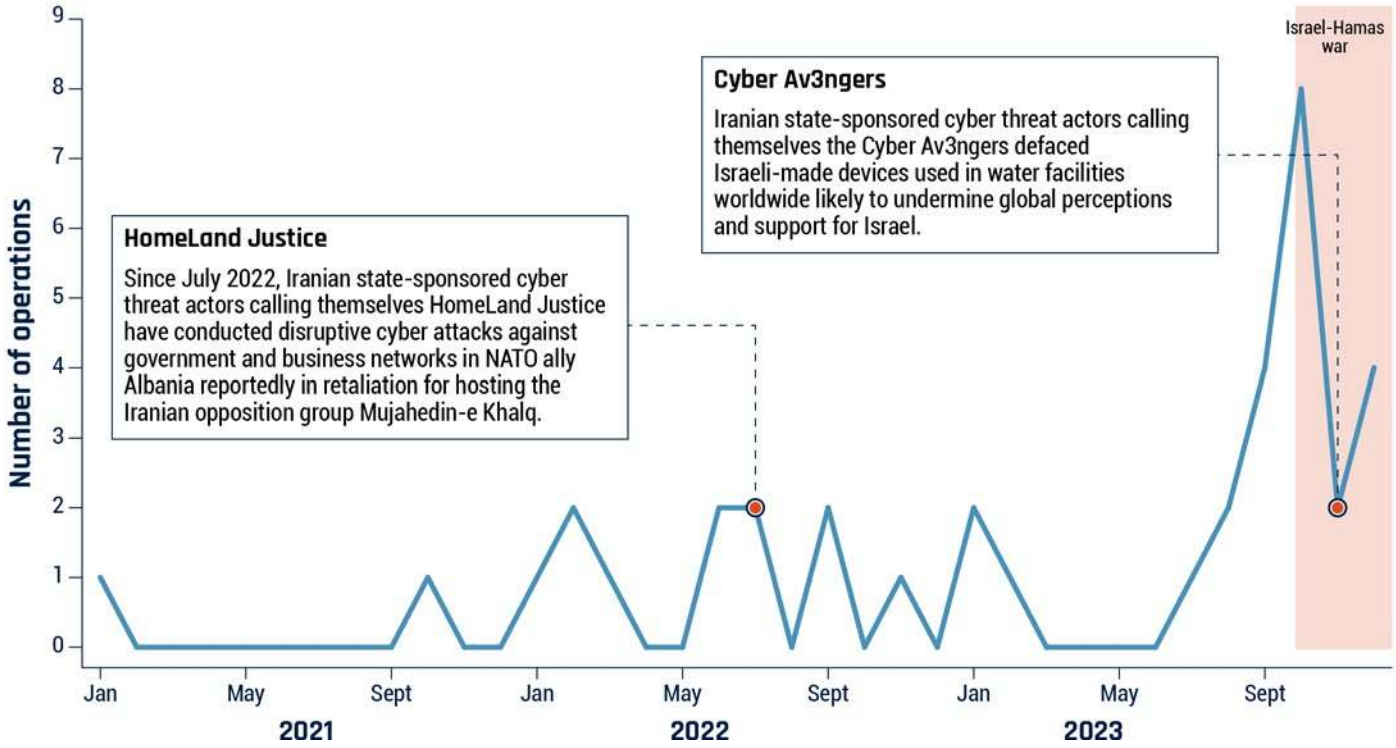
Iran's global coercive cyber operations present a risk to Canada

Iranian state-sponsored cyber threat actors have planned and conducted multi-stage disruptive cyber operations around the world to intimidate Iran's opponents, signal the regime's displeasure, and persuade a country to change its behaviour (Figure 5).[43]

Iranian cyber threat actors have performed denial of service attacks, attempted to manipulate industrial control systems, and accessed government and private networks to encrypt, wipe, and leak data. Iran has developed a network of hacktivist personas and social media channels that exploit these disruptive events to spread the regime's messages and influence the target society while keeping Tehran's official involvement ambiguous and deniable.[44]

We assess that escalation of tensions in Canada-Iran bilateral relations would very likely increase the risk that Canada would be a target of Iranian coercive cyber operations.

Figure 5: Coercive cyber operations publicly linked to Iran (2021-2023)[45]



Iran uses social engineering for transnational repression and espionage

Iranian state-sponsored cyber threat actors likely track and monitor individuals in Canada whom the Iranian regime considers a threat, such as political activists, journalists, human rights researchers, and members of the Iranian diaspora. Iranian cyber threat groups are particularly sophisticated in combining social engineering with spear phishing to support Iran's transnational repression and surveillance activities (Figure 6).[46] For example, Iran has very likely used the downing of Flight 752 over Tehran as a thematic lure for its social engineering and spear phishing operations. These efforts are especially concerning given recent public reports linking Iran to kidnapping and assassination plots against regime opponents living in the West.[47]

Figure 6: Elements of an Iranian social engineering campaign

Iran also uses its social engineering efforts to target public officials and gain access to government networks and private sector organizations globally, including in the aerospace, energy, defence, travel, and telecommunications sectors, in pursuit of its intelligence collection requirements.[48]

The Democratic People's Republic of Korea

The DPRK has a dual-purpose cyber program that prioritizes revenue generation alongside the pursuit of the regime's strategic and intelligence requirements. DPRK state-sponsored cyber threat actors routinely engage in cybercrime activities, such as ransomware and cryptocurrency theft, to fund the regime's political and military ambitions as well as the cyber program's own operations.[49] These financially motivated attacks are very likely conducted under the overarching strategic direction and protection of the North Korean regime, which likely tolerates cybercrime activities that have harmful and disruptive effects.[50]

While we assess that the DPRK's cyber program almost certainly does not pose a strategic cyber threat to Canada on par with countries like the PRC and Russia, the regime's commitment to cybercriminal statecraft almost certainly presents a persistent and well-resourced cybercrime threat to individuals and organizations in Canada across a broad range of industries and sectors of the economy. The DPRK will almost certainly continue to adapt and pivot to new cybercriminal enterprises as digital technologies evolve.[51]

Republic of India

India's leadership almost certainly aspires to build a modernized cyber program with domestic cyber capabilities.[52] India very likely uses its cyber program to advance its national security imperatives, including espionage, counterterrorism, and the country's efforts to promote its global status and counter narratives against India and the Indian government. We assess that India's cyber program likely leverages commercial cyber vendors to enhance its operations.[53]

We assess that Indian state-sponsored cyber threat actors likely conduct cyber threat activity against Government of Canada networks for the purpose of espionage. We judge that official bilateral relations between Canada and India will very likely drive Indian state-sponsored cyber threat activity against Canada.

2

CYBERCRIME **THREATS**

Interconnected online cybercrime ecosystem facilitates Cybercrime-as-a-Service

Financially motivated and opportunistic cybercrime continues to be the cyber threat activity that is most likely to affect Canadians and Canadian organizations. We judge that the continued resilience of cybercrime in Canada and around the world is almost certainly due, in part, to the rise of the Cybercrime-as-a-Service (CaaS) business model. With CaaS, specialized threat actors sell stolen and leaked data and ready-to-use malicious tools to other cybercriminals online, enabling their illicit activities.[54]

CaaS services available online for cybercriminals to purchase

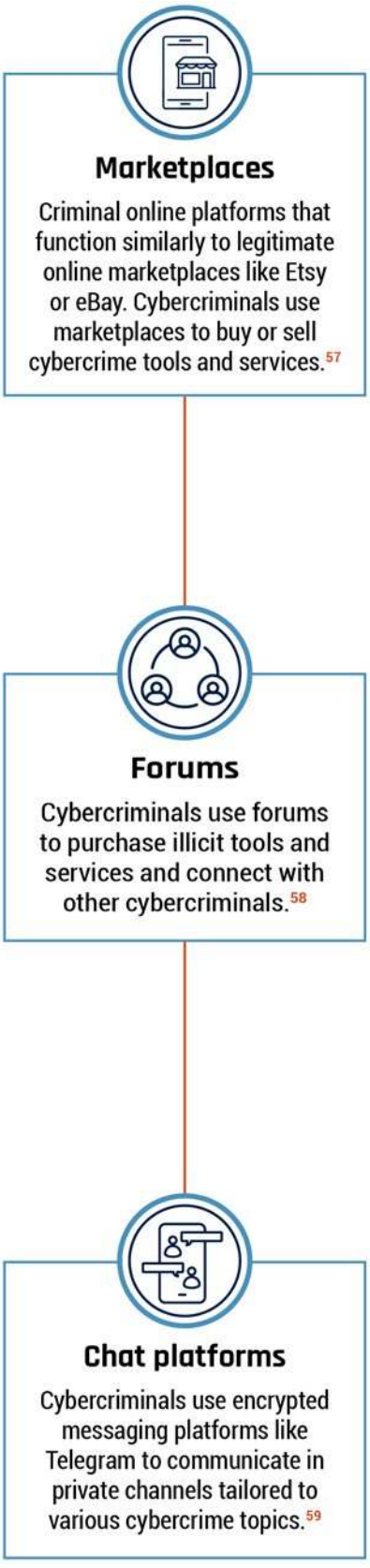
- **Malware-as-a-Service:** services to support the development and deployment of malware that can steal or encrypt victim data or gain remote control of victim systems
- **Ransomware-as-a-Service (RaaS):** a core group of developers will sell or lease their ransomware variant to other threat actors, called affiliates; the core developers will support affiliates' deployment of their ransomware in exchange for upfront payment, subscription fees, a cut of profits, or all three
- **Access-as-a-Service:** specialized threat actors gain access to victim systems and sell access to compromised systems to clients
- **Phishing-as-a-Service (PaaS):** detailed instructions, email templates, and ready-to-use tools for executing phishing attacks
- **DDoS-as-a-Service:** rented out botnets and user-friendly interfaces for clients to conduct DDoS attacks
- **Exploits-as-a-Service:** specialized actors lease or rent exploit kits and support clients on how to use exploits against software vulnerabilities

We assess that CaaS has almost certainly increased the number of actors participating in cybercrime by lowering the barrier to entry and enabling actors who are less technically sophisticated to carry out cybercrime attacks. Even large cybercriminal groups leverage CaaS offerings such as malware, cyber attack infrastructure (e.g., hosting infrastructure) and money laundering services to increase their capacity for cybercrime activity.[55]

Online platforms play an important role in enabling cybercrime

The cybercrime ecosystem is highly interconnected. Online platforms such as cybercrime marketplaces, forums and chat platforms facilitate the sale and resale of stolen data as well as interactions between CaaS providers and cybercriminals seeking their services. These online platforms also play a significant role by facilitating professional connections and resource sharing between a range of cybercriminals.[56]

Figure 7: How cybercriminals use online platforms



Genesis Market

Genesis Market was a cybercriminal marketplace that sold credentials stolen from millions of compromised computers worldwide. Cybercriminals used Genesis to purchase account access credentials and digital fingerprints, which allowed them to access victims' online accounts without triggering security warnings. Genesis Market has been linked to millions of financially motivated cyber incidents, including fraud and ransomware attacks,[60] from its inception in March 2018 until it was disrupted by law enforcement in April 2023.[61]

Fraud and scams remain a persistent threat to Canadians

As assessed in NCTA 2023-2024, we judge that fraud and scams are almost certainly the most common forms of cybercrime impacting Canadians. Cybercriminals attempt to steal personal, financial, and corporate information using social engineering tactics like phishing.[62] Phishing is one of the most reported types of fraud in Canada and spear phishing has one of the highest reported levels of financial impact to victims.[63] For example, spear phishing can lead to compromises that result in the theft of sensitive data and can cause significant financial losses for businesses.[64]

Figure 8: Losses from fraud in Canada (in CAD)[65]

Phishing attacks becoming more accessible and sophisticated with new tools and services

We judge that the threat from fraud and scams will continue to grow in the next two years with the proliferation of Phishing-as-a-Service kits that cybercriminals can purchase online, as well as chatbots powered by artificial intelligence (AI) that craft convincing phishing emails for cybercriminals. These tools make phishing attacks more accessible for cybercriminals who are less technically sophisticated.[66]

Ransomware threat to Canada continues to grow and evolve

Ransomware is one of the most disruptive forms of cybercrime facing Canada and our allies. Since 2020, ransomware attacks have increased in scope, frequency, and complexity.[67] We judge that ransomware will almost certainly continue to be the most impactful cyber threat facing Canadian organizations in the next two years as ransomware actors constantly refine their tactics to maximize profits.[68]

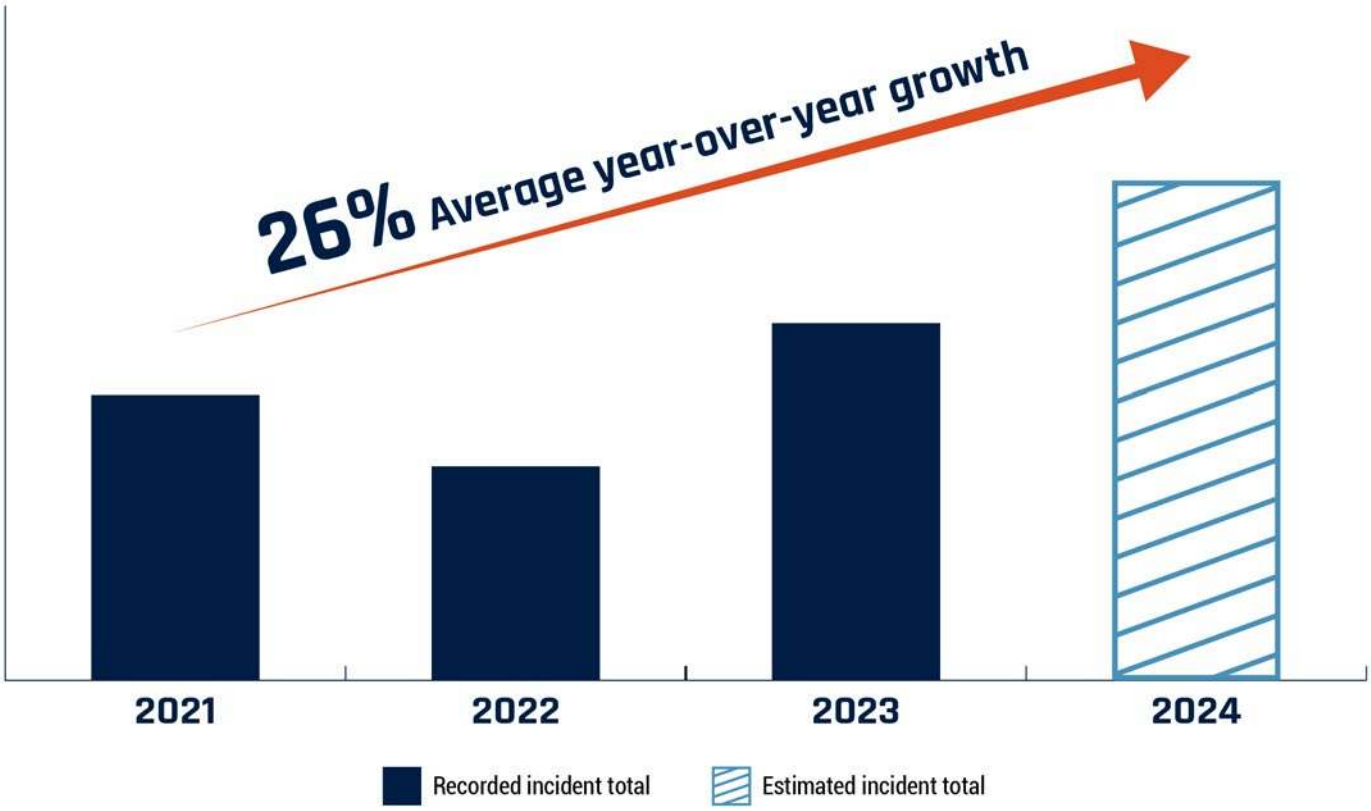
Ransomware incidents and ransom payments are growing

2023 was a record-breaking year for ransomware. By some estimates, the global number of ransomware incidents rose 74% in 2023 compared with 2022,[69] and global ransom payments reached a record of $1 billion USD.[70] By one estimate, the average ransom paid in Canada in 2023 was $1.130 million CAD, an increase of almost 150% in two years.[71] Open-source reporting reveals that these trends continued into the first half of 2024, with ransom payments and incidents on track to exceed numbers observed in 2023.[72] Observed increases in ransomware are almost certainly higher since many incidents go unreported.[73] We judge that the ransomware threat will almost certainly continue to grow in the next two years unless significant disruptions to the ransomware ecosystem occur.

Global top ransomware threats 2023

1. **LOCKBIT:** LockBit is a RaaS cybercrime group that operates a ransomware variant of the same name that has been used to impact a wide range of critical infrastructure entities, including healthcare, energy, and government organizations.[74]
2. **ALPHV:** ALPV is a RaaS cybercrime group that operates the ransomware variant named BlackCat and has been used to impact a wide range of industries, including financial, manufacturing, legal, and professional services organizations.[75]
3. **CL0P:** CL0P is a RaaS operated by the Russian-speaking cybercriminal group TA505 that has been used to impact a wide range of industries by exploiting unpatched software vulnerabilities.[76]
4. **PLAY:** Play is a RaaS cybercrime group operating a ransomware variant of the same name that has been used to impact healthcare and manufacturing organizations.[77]
5. **BLACK BASTA:** Black Basta is a RaaS cybercrime group operating a ransomware variant of the same name that has been used to impact critical infrastructure entities, including healthcare and government organizations.[78]

Figure 9: Relative growth from 2021 of Canadian ransomware incidents known to the Cyber Centre[79]



In 2022, we judged that ransomware incidents decreased, in part, due to heightened law enforcement pressure that likely caused some ransomware actors to temporarily pause their activities. Russia's invasion of Ukraine also likely caused disruptions in the ransomware ecosystem. For example, some ransomware actors likely shifted their focus from financially motivated cybercrime to politically motivated attacks.[80] However, in 2023, ransomware actors very likely resettled and recovered from those disruptions and elevated their tactics to make up for financial losses from 2022.[81]

Impact of CL0P—Compromises of digital supply chains

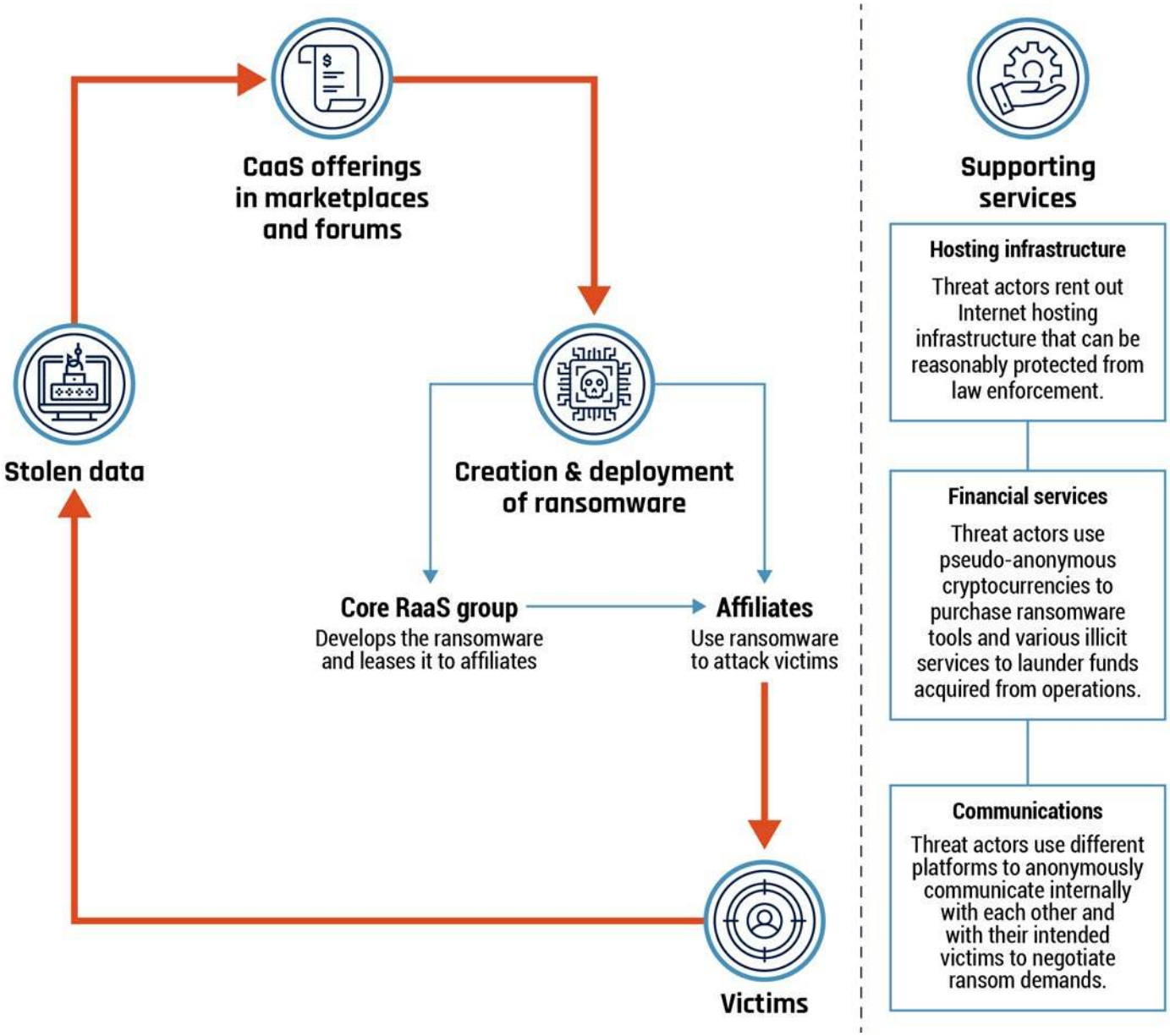
Many organizations rely on digital supply chains made up of various vendors for different applications and services. Cybercriminals can turn a breach against a single vendor into cascading incidents impacting multiple victim organizations.[82] As an example, the spike in global ransomware incidents in 2023 can very likely be partly attributed to CL0P, a ransomware strain operated by Russian-speaking cybercriminals.[83] CL0P was used to exploit unpatched vulnerabilities in the popular file transfer software applications GoAnywhere and MOVEit. In the MOVEit exploitation alone, CL0P impacted an estimated 2,750 enterprises and 94 million individuals[84] and amassed approximately $100 million USD in ransom payments.[85] Because of their profitability, ransomware attacks against digital supply chains will almost certainly continue in the next two years.

Top ransomware groups operate on Ransomware-as-a-Service Model

As highlighted in NCTA 2023-2024, most of the top ransomware groups impacting Canada operate on a Ransomware-as-a-Service (RaaS) business model where a core group of ransomware actors sell or lease their ransomware variant to affiliates who launch attacks. The RaaS ecosystem operates within the wider CaaS ecosystem. It is enabled by a complex supply chain of various actors offering different CaaS services that can be used to carry out ransomware attacks. This includes supporting services that underpin the functioning of the entire ecosystem (see Figure 10).[86]

We judge that the continued popularity of RaaS is almost certainly contributing to the rise in ransomware incidents by lowering the technical barriers to entry for more actors to carry out attacks without needing to develop their own malware.[87] It is difficult to assess the precise location of ransomware actors. However, we judge that the top ransomware groups impacting Canada have a core membership that is very likely based in countries that make up the former Soviet Union, although their affiliates operate globally.

Figure 10: RaaS ecosystem



Ransomware is impacting Canada's critical infrastructure

We assess that ransomware actors are almost certainly opportunistic and do not target specific industries. In the last few years, a wide range of Canadian businesses have been impacted by ransomware incidents, including large retailers and educational institutions. These incidents demonstrate that no entity is immune from the threat of ransomware. However, ransomware is almost certainly the top cybercrime threat facing Canada's critical infrastructure because it can immobilize critical business operations, destroy or damage important business data, and reveal sensitive information.[88] In addition to the financial losses associated with system repairs and operational disruptions, ransomware attacks can disrupt critical services that put victims' physical safety and emotional wellbeing in jeopardy.[89]

Critical infrastructure is an attractive target for ransomware actors because these entities are perceived as being more willing to pay large ransoms to prevent disruptions to critical operations. In 2021, ransomware incidents impacting Colonial Pipeline in the U.S. and the JBS Foods operations in North America and Australia resulted in multimillion-dollar payouts for ransomware actors.[90]

According to cyber security reporting, victims in 2023 were becoming less likely to pay ransom demands.[91] We judge that the perceived opportunities to earn high profits, combined with victims' reduced willingness to pay, has almost certainly encouraged more technically sophisticated ransomware groups to elevate their extortion techniques and hire skilled affiliates capable of targeting critical infrastructure entities to extract larger ransom payouts.[92] This is called "big game hunting," and we judge that it is the primary strategy used by many of the most prolific ransomware groups impacting Canada.[93]

Figure 11: Cyber incidents impacting Canada's critical infrastructure

Canada's critical infrastructure sectors have been impacted by various cyber incidents, including ransomware incidents and network breaches, that resulted in disruptions to critical business functions.

Energy sector

June 2023: Suncor Energy experienced a cyber incident that affected the company's Petro-Canada subsidiary. This temporarily impacted credit and debit processing at retail gas stations across Canada.[94]

Healthcare sector

December 2022: SickKids hospital in Toronto experienced a ransomware incident by an affiliate of the LockBit ransomware group. The impact of the incident was minimal and LockBit issued a public apology and offered to share the decryptor with the hospital.[95]

October 2023: 5 hospitals in Southern Ontario were impacted by a ransomware incident carried out by a ransomware group called Daixin. The incident impacted the hospitals' information technology (IT) provider, forcing the hospitals to temporarily shut down internal health systems. It resulted in the theft of sensitive files and caused delays in patient care.[96]

February 2024: LockBit reportedly claimed responsibility for a ransomware incident affecting Canadian pharmacy chain London Drugs, which forced the company to temporarily close some of its stores in Western Canada.[97]

Government sector

June 2023: The Government of Nova Scotia was impacted by CL0P's global exploitation of the MOVEit file transfer system. This resulted in a breach of personal information for an estimated 100,000 current and past provincial government employees.[98]

September 2023: Brookfield Global Relocation Services, which assists Canadian military and foreign service personnel with relocations, was subject to an unauthorized access breach that impacted information about Government of Canada personnel.[99]

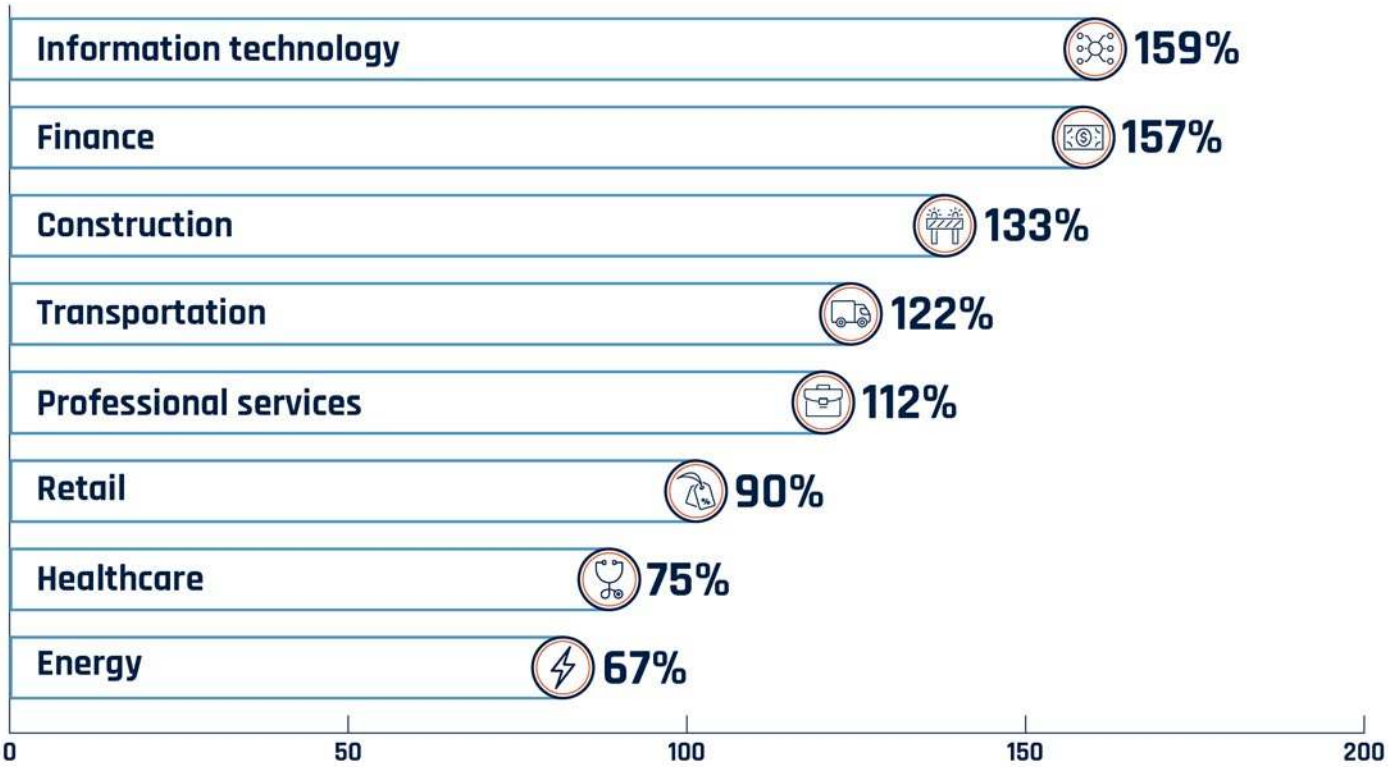
March 2024: The City of Hamilton was subject to a ransomware incident that impacted IT systems that manage various municipal functions, such as city phone lines, for weeks.[100]

Ransomware incidents hitting the healthcare sector are on the rise

Ransomware incidents impacting the healthcare sector have been steadily increasing worldwide.[101] Canada and our allies have collectively experienced high-profile ransomware attacks against the healthcare sector in recent years. In March 2024, Change Healthcare paid a multimillion-dollar ransom for the restoration of sensitive medical data after a ransomware attack disrupted billing processes for prescriptions in pharmacies across the U.S.[102] Soon after, in June 2024, a ransomware incident impacting pathology firm Synnovis caused major delays to several London, UK hospitals and resulted in the theft of sensitive data, which ransomware actors published online.[103]

By one estimate, ransomware incidents impacting the healthcare sector have nearly doubled since 2022.[104] This is concerning since these incidents directly disrupt the healthcare sectors' ability to deliver critical services to patients.[105] However, we judge that ransomware actors will almost certainly continue to choose victims based on opportunity rather than specific targeting in the next two years. Any observed increases in ransomware incidents impacting the healthcare sector will almost certainly reflect an increase in ransomware incidents overall, as well as the continued use of big game hunting by major ransomware groups.

Figure 12: Increase in Canadian ransomware incidents by sector observed by the Cyber Centre from 2022 to 2023



Ransomware actors are evolving their tactics to boost profits and evade detection

Ransomware actors are constantly evolving their strategies and adapting their techniques to maximize their profits and evade law enforcement detection.[106] We judge that these financial incentives combined with the flexibility of the RaaS model have almost certainly bolstered ransomware actors' resiliency in the face of law enforcement disruptions.

Ransomware ecosystem is splintering under law enforcement pressure

Recent major international law enforcement operations to tackle the ransomware ecosystem almost certainly degraded the targeted groups' capabilities and caused chaos in the cybercriminal underground.[107] However, we judge that these disruptions almost certainly will not have an enduring impact on the ransomware environment because, unless members of core RaaS groups are arrested, actors often find ways to adjust, rebrand, and resume their operations.[108]

By that same token, it is almost certain that the CaaS model has made the ransomware ecosystem more resilient to law enforcement action. The complex web of enabling services and cybercriminals interacting in borderless online spaces makes investigating cybercrime difficult.[109] If law enforcement disrupts a popular CaaS provider, the actor behind it will often rebrand and relaunch their service, or another service will quickly take their place. The flexibility of the CaaS model also makes it easy for cybercriminals to use multiple service providers simultaneously so they can pivot to new service providers if one is disrupted.[110]

International law enforcement disruptions against the ransomware ecosystem

The groups below were major players in the ransomware ecosystem. Prior to their disruptions, these groups were linked to over 1,000 compromises around the world and had amassed millions in ransom payments.[111]

- **January 2023:** Hive's networks were infiltrated, decryptor tools were provided to victims to recover their data, and Hive's infrastructure was seized by law enforcement.[112]
- **December 2023:** ALPHV (also known as BlackCat) had their infrastructure seized by law enforcement and a decryptor tool was provided to victims.[113]
- **February 2024:** LockBit's infrastructure was seized by law enforcement and cryptocurrency accounts linked to LockBit were frozen. Some core members were also arrested.[114]

In the next two years, we judge that the ransomware ecosystem will almost certainly become increasingly splintered.[115] Affiliates will almost certainly begin to act independently and create their own ransomware variants to reduce their susceptibility to law enforcement disruptions.[116] Further complicating this threat landscape, we judge that smaller ransomware groups will likely begin collaborating to increase their capabilities, or they will try to attract affiliates from ransomware groups that are subject to disruption operations to take the place of their former competitors and grab a greater share of the ransomware market.[117]

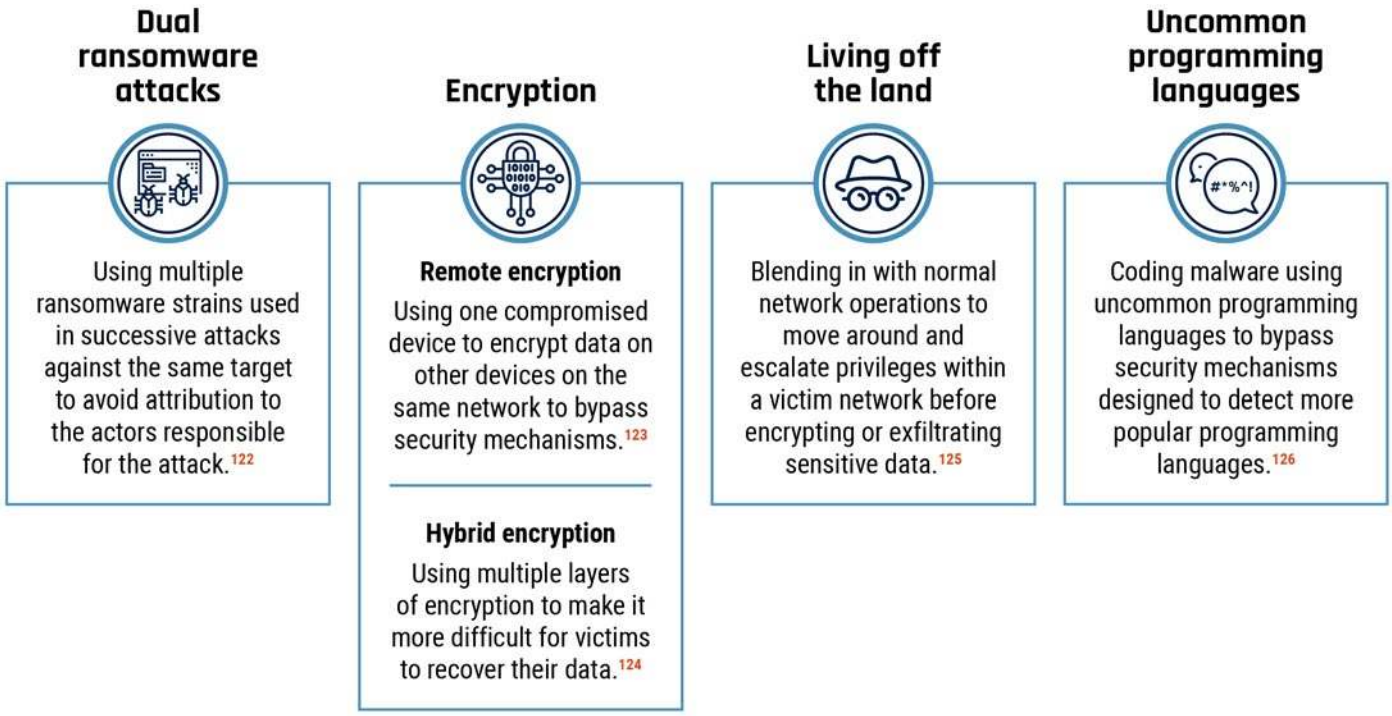
Intensifying extortion methods

Ransomware actors are increasing pressure on victims to pay ransoms by ramping up their extortion methods. Some ransomware groups have started posting count downs on their websites indicating when they plan to leak stolen data, or even directly calling victims or their clients and threatening to release their personal information if they do not pay the demanded ransom.[118] Additionally, ransomware actors have publicly criticized the organizations that have fallen victim to their ransomware to damage their reputation, and have encouraged clients of the victim organizations to file lawsuits against the victims.[119] Ransomware actors have also started to use new legislation that require victims to report ransomware incidents to apply pressure to their victims. For example, ALPHV-affiliated actors claimed that they filed a complaint with the U.S. Securities and Exchange Commission against a victim for failing to report the ransomware incident that ALPHV itself conducted against them.[120] We judge that ransomware actors' extortion methods will continue to evolve in the next two years in an effort to maximize their likelihood of receiving payment from victims.

Ransomware actors are using new tactics to obfuscate their activities

As ransomware actors have come under intense scrutiny from law enforcement, many have started layering obfuscation techniques to camouflage and hide themselves from detection and minimize their digital footprints.[121]

Figure 13: Obfuscation techniques used by ransomware actors



Collaboration is necessary to tackle the evolving ransomware threat

We judge that ransomware actors will continue to diversify their tactics in response to heightened law enforcement attention. Understanding this threat and the CaaS business model and recognizing the dynamic nature of this ecosystem will be critical to tackling it in the future. Collaboration between industry, law enforcement, and all levels of government, as well as bolstering Canadians' awareness about cybercrime, are imperative to building resilience against this evolving threat.[127]

3

TRENDS SHAPING CANADA'S **CYBER THREAT LANDSCAPE**

Background

CSE uses its expertise to help monitor, detect, and investigate threats against Canada's information systems and networks. Based on our observations since NCTA 2023-2024, we have identified five trends that will shape Canada's cyber threat environment until 2026:

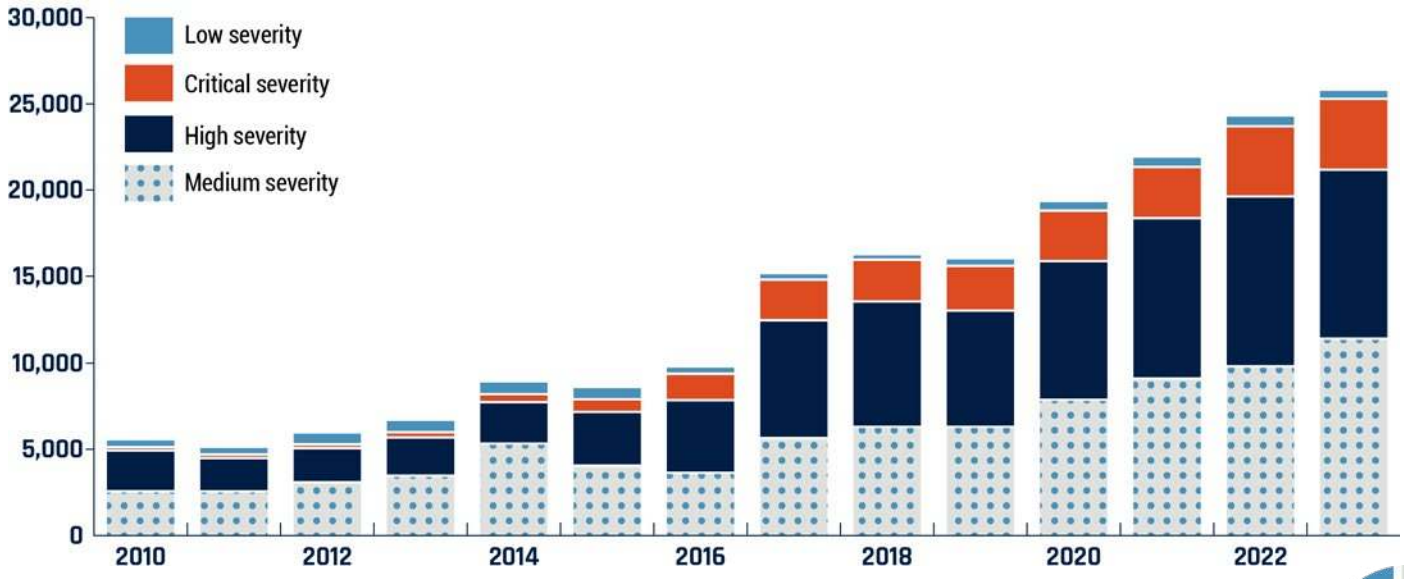
- **Trend 1:** Artificial intelligence (AI) technologies are amplifying cyber space threats
- **Trend 2:** Cyber threat actor tradecraft is evolving to evade detection
- **Trend 3:** Geopolitically inspired non-state actors are creating unpredictability
- **Trend 4:** Vendor concentration is increasing cyber vulnerability
- **Trend 5:** Dual-use commercial services are in the digital crossfire

Trends discussed in past NCTAs are still relevant

Before discussing the five trends above in more detail, it is important to note that trends impacting Canada's cyber threat landscape that we raised in previous NCTAs remain relevant today. These trends continue to evolve over time in light of geopolitical, technological, and threat actor developments. For example:

- **The cyber threat surface keeps expanding:** In addition to the continued adoption and deployment of the Internet of Things (e.g., connected vehicles), the boom in cloud-based AI platforms and services is forecasted to drive demand for supporting infrastructure, such as AI-capable data centres and energy generation, and lead to the transfer of even more data to cloud environments. It is also very likely that AI-focused organizations (including AI labs that conduct AI research and develop AI models) are now more prominent targets for cyber threat actors.[128]
- **Supply chain attacks continue:** Cyber threat actors continue to launch digital supply chain attacks where a threat actor compromises or exploits a software, information technology (IT), or cloud services vendor to enable it to exploit the customers that use the service. This includes double supply chain attacks where one supply chain attack enables another.[129]
- **Publicly known vulnerabilities are still being exploited:** Cyber threat actors are constantly scanning for publicly known security vulnerabilities in software and exploiting unpatched vulnerabilities to gain unauthorized access to private and public networks. The number of common vulnerabilities and exposures (CVE) continues to grow (Figure 14). The time it takes threat actors to exploit these vulnerabilities continues to decrease, with attacks starting within days after their disclosure.[130]

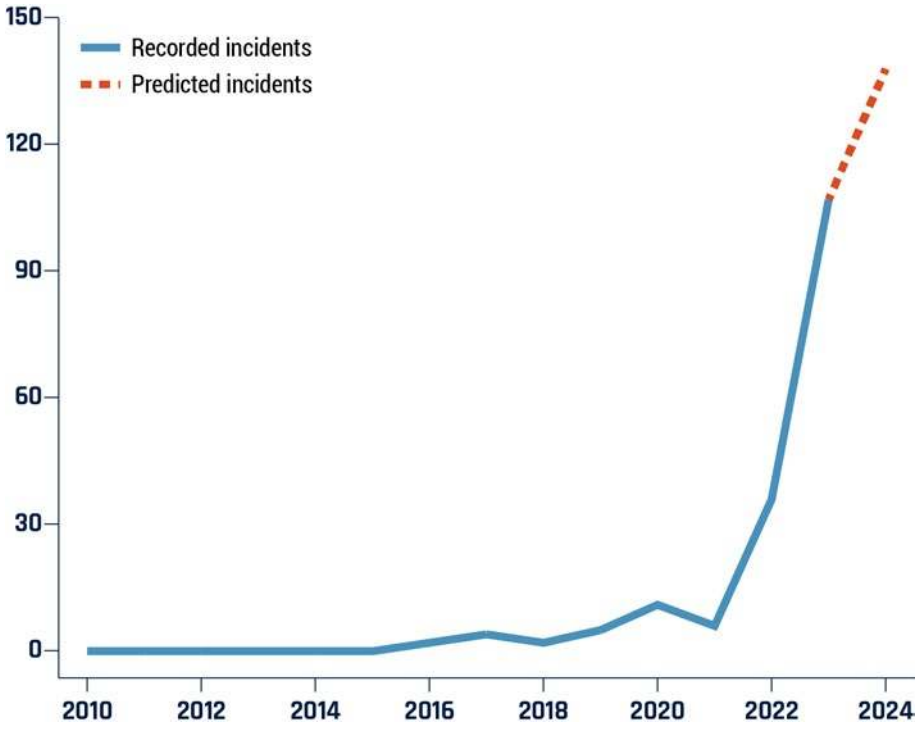
Figure 14: Common vulnerabilities and exposures (CVE) count by severity[131]



Trend 1: Artificial intelligence technologies are amplifying cyberspace threats

AI technologies are almost certainly lowering the barriers to entry and enhancing the quality, scale, and precision of malicious cyber threat activity.[132] Cybercriminals and state-sponsored cyber threat actors are using generative and predictive AI tools (including large language models (LLMs)) to support their work processes, from content generation to big data analysis. We assess that technically skilled cyber threat actors will almost certainly attempt to misuse AI tools in novel ways over the next two years as the technology develops. This includes automating parts of the cyber attack chain to improve productivity.[133]

Figure 15: Publicly reported worldwide generative AI incidents resulting in harm or near harm[134]



AI is improving the personalization and persuasiveness of social engineering attacks

Cybercriminals and state-sponsored cyber threat actors are almost certainly using LLMs to improve social engineering attacks that manipulate targets into doing something that is detrimental to their interests, such as disclosing sensitive information, authorizing fraudulent transactions, or downloading malware.[135] Generative AI tools enable cyber threat actors to create realistic audio and visual content impersonating trusted individuals (i.e., deepfakes). These help to establish legitimacy with and persuade targets.[136] Cyber threat actors are also using AI to craft personalized phishing emails at scale with convincing and grammatically correct language that mimics human writing styles, making it harder for recipients to identify and filter phishing attempts.[137]

AI technologies are enhancing the quality and scale of foreign online influence campaigns

In NCTA 2023-2024, we discussed how state cyber threat actors can create and spread AI-generated disinformation. Since then, a growing number of countries, including the PRC, Russia, Iran, and Israel, have reportedly incorporated fake or deceptive AI-generated articles, images, and videos (deepfakes) in their online influence operations (misinformation, disinformation, and malinformation) to enhance the quality and scale of their campaigns.[138] They are also very likely using AI tools to generate fictitious social media bot accounts and online personas in an effort to amplify engagement.[139] These campaigns are designed to weaken opponents by polluting the online information space, undermining trust in institutions, and sowing doubt and division in the target society.[140]

We assess that AI-enhanced disinformation is more likely to gain traction when it has one or more of these characteristics:[141]

- amplifies polarizing narratives that already exist in the target society
- fills a void in the information space
- is spread by a trusted or official source(s)
- targets time-sensitive situations when there is limited time to debunk fake content

The rise of AI-generated websites

Foreign states are creating fake news websites masquerading as real news outlets as part of their disinformation campaigns. Many of the sites are designed to look like local news outlets that have closed down and rely on AI-generated content.[142]

Predictive AI is improving big data analysis capabilities

Well-resourced states are very likely leveraging AI tools to help process and analyze large volumes of data they collect. We assess that foreign intelligence services are very likely using AI-enabled data analytics to find patterns and trends in bulk data, gain insights on individuals and assets of interest, and inform follow-on cyber operations.[143]

Trend 2: Cyber threat actor tradecraft is evolving to evade detection

As network defences have improved at detecting and responding to security threats, cyber threat actors are evolving their tradecraft in an attempt to minimize detection and stay hidden operating on victim systems longer.

Cyber threat actors are targeting and exploiting edge devices to access networks

Cyber threat actors are exploiting vulnerabilities in security and networking devices that sit at the perimeter of networks—known as "edge" devices (e.g., routers, firewalls, and virtual private network [VPN] solutions). By compromising an edge device, a cyber threat actor can enter a network, monitor, modify, and exfiltrate network traffic flowing through the device, or possibly move deeper into the victim's network.

Cyber threat actors very likely target edge devices because network defenses may have limited capability to monitor and detect malware activity on them, especially compared to other access vectors, such as phishing emails.[144] For example, in early 2024, Canada and our allies detected that a well-resourced and sophisticated state-sponsored cyber threat actor had collected and exfiltrated data by exploiting 2 newly discovered vulnerabilities in VPN devices used by government and critical national infrastructure networks.[145]

Cyber threat actors are "living off the land" in compromised environments to stay undetected

Cyber threat actors using living-off-the-land (LOTL) techniques repurpose native system tools and processes that are already present in the target's environment to move throughout the network discreetly.[146] They do not deploy malware or custom tools on the compromised network. This makes it challenging for network defences to detect and discover intrusions.[147] PRC, Russian, and Iranian state-sponsored cyber threat actors use LOTL techniques.[148] For example, a Russian cyber threat actor reportedly compromised a Ukrainian electric utility's network in October 2022 and used LOTL techniques to move through the utility's operational technology environment before triggering a power outage.[149]

Attacker dwell time is dropping

The global median dwell time—number of days an attacker is present in a compromised system before detection—continued to drop from 2022 to 2023.

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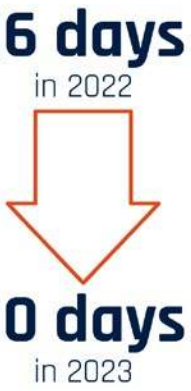


Cyber threat actors are abusing domestic infrastructure to hide their malicious activity

State-sponsored cyber threat actors and cybercriminals are almost certainly conducting malicious activity against Canada using virtual resources and networking infrastructure (e.g., routers) located in North America to limit scrutiny and visibility into their operations.[151] For example, Russian and PRC state-sponsored cyber threat actors have been observed routing their malicious cyber operations through compromised small office and home office (SOHO) network equipment located in Canada and the U.S., such as routers belonging to unsuspecting households and businesses, to blend into normal network activity.[152]

Trend 3: Geopolitically inspired non-state actors are creating unpredictability

Geopolitical conflicts and tensions are inspiring disruptive cyber threat activity from non-state groups, commonly referred to as hacktivists. Geopolitically motivated hacktivists typically conduct attacks to gain attention, such as DDoS attacks, website defacements, and data leaks. Some groups have elevated the impact of their activity by opportunistically targeting and disrupting vulnerable critical infrastructure, such as municipal water systems, risking serious harm to the public.[153]

Geopolitically motivated hacktivism is surging around military conflicts. Hacktivist groups have carried out campaigns related to Russia's invasion of Ukraine in 2022 and the Israel-Hamas war in 2023.[154] Diplomatic tensions are also inspiring hacktivist activity. After Canada accused India of involvement in the killing of a Canadian citizen, a pro-India hacktivist group claimed to have defaced and conducted brief DDoS attacks against websites in Canada, including the public-facing website of the Canadian Armed Forces.[155]

This non-state ecosystem is dynamic and unpredictable. Some hacktivists are genuinely motivated by a mix of patriotism, ideology, or a political cause, but others opportunistically take advantage of conflicts for personal benefit or notoriety. New groups regularly appear and established groups dissolve and re-emerge with new names. Actors shift their focus and motivations. Different groups coordinate and collaborate, including across multiple conflicts.[156] Although hacktivist activities can sometimes align with an adversarial state's interests, the relationship, if any, between a hacktivist and the state can be difficult to discern.

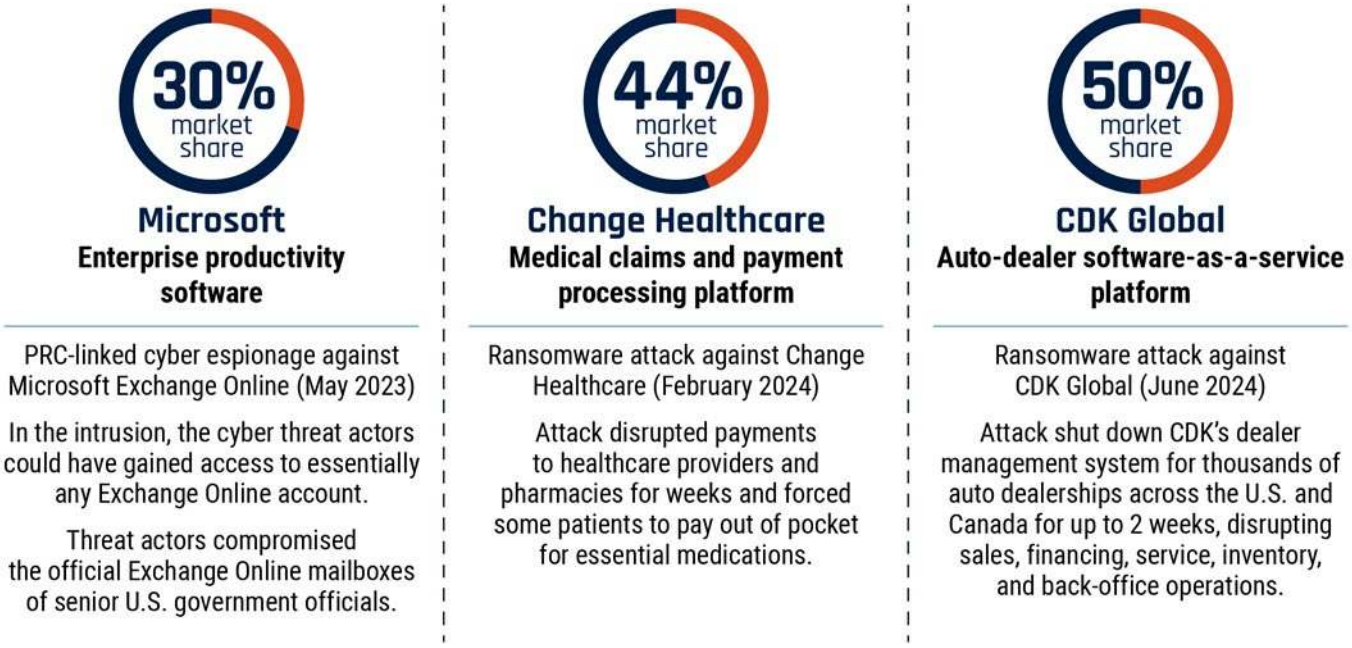
Trend 4: Vendor concentration is increasing cyber vulnerability

The provision of many technology services is concentrated, with only a few large providers of a given digital service, each with a large base of users.[157] Organizations in both the public and private sectors, including banks, airlines, and healthcare providers, rely on these dominant service providers, such as a cloud provider or a specialized Software-as-a-Service platform, to support critical functions and operations.[158] A cyber incident impacting a single dominant service provider can impact an entire sector.

Dominant service providers are magnets for malicious cyber threat activity. Cyber threat actors target dominant vendors seeking to steal customer data or demand ransom payments.[159] For example, state-sponsored cyber threat actors are persistently targeting and developing capabilities to compromise the three major commercial cloud service providers that together make up an estimated 65% of the global cloud market: Amazon, Microsoft, and Google.[160] This includes researching the internal networks of the cloud platforms and improving techniques to covertly bypass security mechanisms and exfiltrate data.

When dominant service providers are compromised, the impact of cyber security incidents are amplified. Cyber threat activity against services that are digital chokepoints—single points of failure within supply chains—can have cascading and system-wide disruptive impacts on the economy and society, including endangering our national security (Figure 16).[161]

Figure 16: Recent cyber attacks against dominant vendors and their market share[162]



Despite the fact that dominant service providers know that they are major targets, the scale and complexity of their operations may limit their ability to discover and fix cyber vulnerabilities.[163] For instance, in May 2023, a threat actor assessed to be affiliated with the PRC compromised Microsoft's cloud-based Exchange email service in a breach that the U.S. Cyber Safety Review Board investigating the incident found was preventable.[164] Less than a year later in November 2023, a Russian state-sponsored cyber threat actor compromised Microsoft's Exchange service and exfiltrated data from Microsoft's own corporate email accounts, including customer data. Then, in July 2024, Microsoft's Azure cloud service failed to withstand a DDoS attack, disrupting global access to some Microsoft services for hours.[165] According to Microsoft, an error in its own defence mechanisms contributed to the outage.[166]

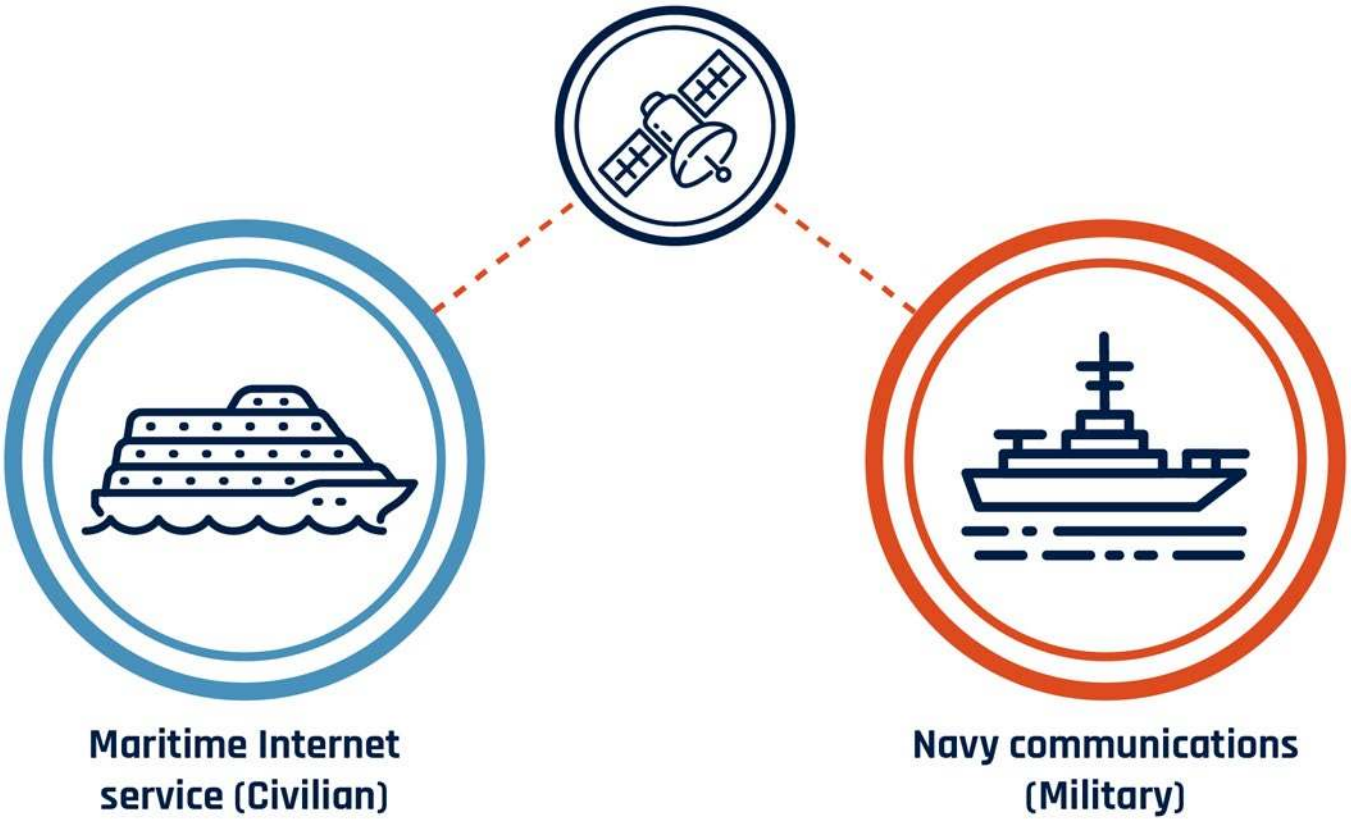
Trend 5: Dual-use commercial services are in the digital crossfire

Governments around the world are turning to services available in the commercial market to gain a competitive edge over their adversaries and ensure resilience during a conflict. Commercial solutions, such as commercial satellite communications systems and advanced computing capabilities, offer militaries and intelligence agencies access to innovative technologies at scale that can be deployed quickly.[167]

We assess that commercial services that provide service to both civilian and military customers (i.e., dual-use services) are almost certainly targets of state-sponsored cyber threat activity.[168] Our adversaries have signaled an intent and demonstrated the capability to use cyber attacks to disrupt, degrade, or deny opponents access to commercial services during an armed conflict.[169] These attacks can have cascading disruptive effects on civilian and critical infrastructure customers that depend on the same services.

For instance, state-sponsored cyber threat actors are very likely targeting dual-use commercial satellite systems that support military or government communications, remote sensing, and navigation capabilities. Since the start of Russia's invasion of Ukraine in February 2022, Russian state-sponsored cyber threat actors have conducted cyber and electronic warfare operations (like jamming and spoofing) against commercial satellite communications services used by the Ukrainian military.[170] At least one of these attacks disrupted satellite Internet service to civilian customers outside of the conflict zone.

Figure 17: Example of a dual-use satellite communications service



Conclusion

Cyber threat actors present a persistent threat to Canada's economic prosperity and national security. As a wealthy country, Canada will remain a valuable target for financially motivated cybercriminals that are supported by a highly adaptable and resilient cybercrime ecosystem. Meanwhile, the threat to Canada from state-sponsored cyber threat activity will be influenced by geopolitical events beyond our borders, the status of Canada's foreign relations, and an international environment defined by economic and technological rivalry.[171] The threats in cyberspace will increasingly reflect a global system where an array of actors are forging networks of varying strength and convenience in pursuit of their own self-interests.[172]

Despite our cyber vulnerabilities and the evolving cyber-threat environment, the intensity and impact of cyber threats to Canada can be mitigated through awareness and best practices in cyber security by both individuals and organizations.

CSE leverages all aspects of its mandate, and its partnerships, to defend federal networks and systems of importance to the Government of Canada. CSE will continue to share important information on the cyber threat landscape with Canadians, the private sector, and critical infrastructure. Canadians can be assured that the Cyber Centre is dedicated to tracking cyber threats to Canada, advancing our cyber security, and protecting the systems that we rely on daily, offering support to critical infrastructure networks as well as to other systems of importance to Canada. We will continue to work with the private sector to drive security and resilience and forge international partnerships to achieve shared cyber security goals.

We encourage readers to consult our cyber security guidance[173] for more information on the cyber threats outlined in this assessment and how to protect against them. Organizations may also consult our Cross-Sector Cyber Security Readiness Goals Toolkit[174] to learn how to increase their cyber security posture.

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