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CSEC SIGINT Cyber Discovery: Summary of the current effort

[REDACTED]

Communications Security Establishment Canada
Covert Network Threats
Cyber-Counterintelligence

Discovery Conference
GCHQ – November 2010

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Outline

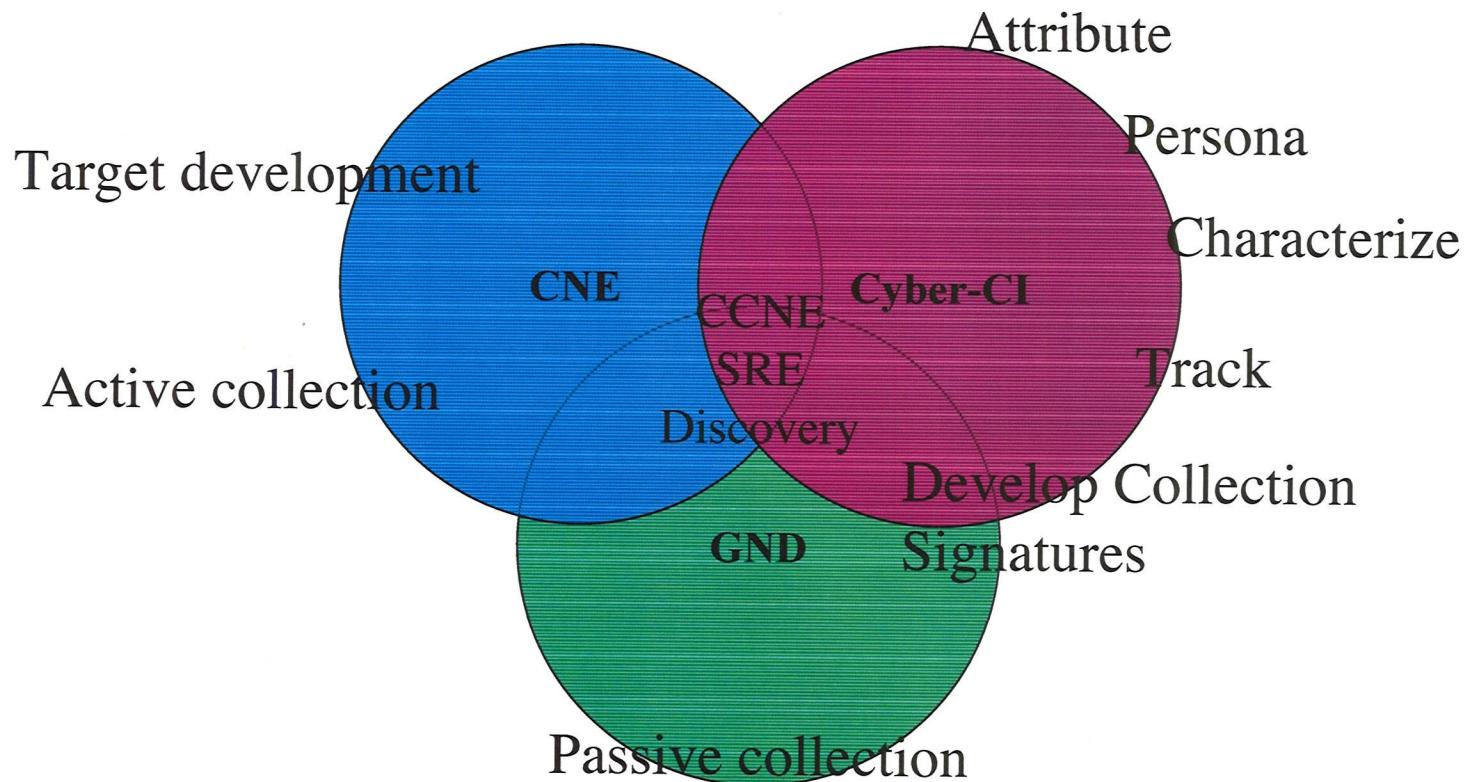
- CSEC SIGINT Cyber
 - K0G (CCNE)
 - GA4 (GND)
 - CNT1 (CCI)
- CSEC SIGINT Cyber – Operational Discovery
 - Network Based Anomaly Detection
 - Host Based Anomaly Detection
- Contacts

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Canada The Government of Canada logo, featuring a red maple leaf and the word 'Canada'.



CSEC Cyber Counterintelligence



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Counter CNE (K0G)

- Part of CSEC CNE operations (K0)
- Recently formed matrix team
- Analysts and operators from CNE Operations, Cyber-Counterintelligence and Global Network Detection
- Mandate:
 - Provide situational awareness to CNE operators
 - Discover unknown actors on existing CNE targets
 - Detect known actors on covert infrastructure
 - Pursue known actors through CNE
 - Review OPSEC of CNE operations



Global Network Detection (GND)

- Develop capabilities to improve the ability of the SIGINT collection system to detect Computer Network Exploitation and Computer Network Attack
- Help enable CSEC's CNE program through timely identification of vulnerable computer systems and foreign CNE methodologies/activities
- Act as technical liaison between IT Security and SIGINT for CNO issues



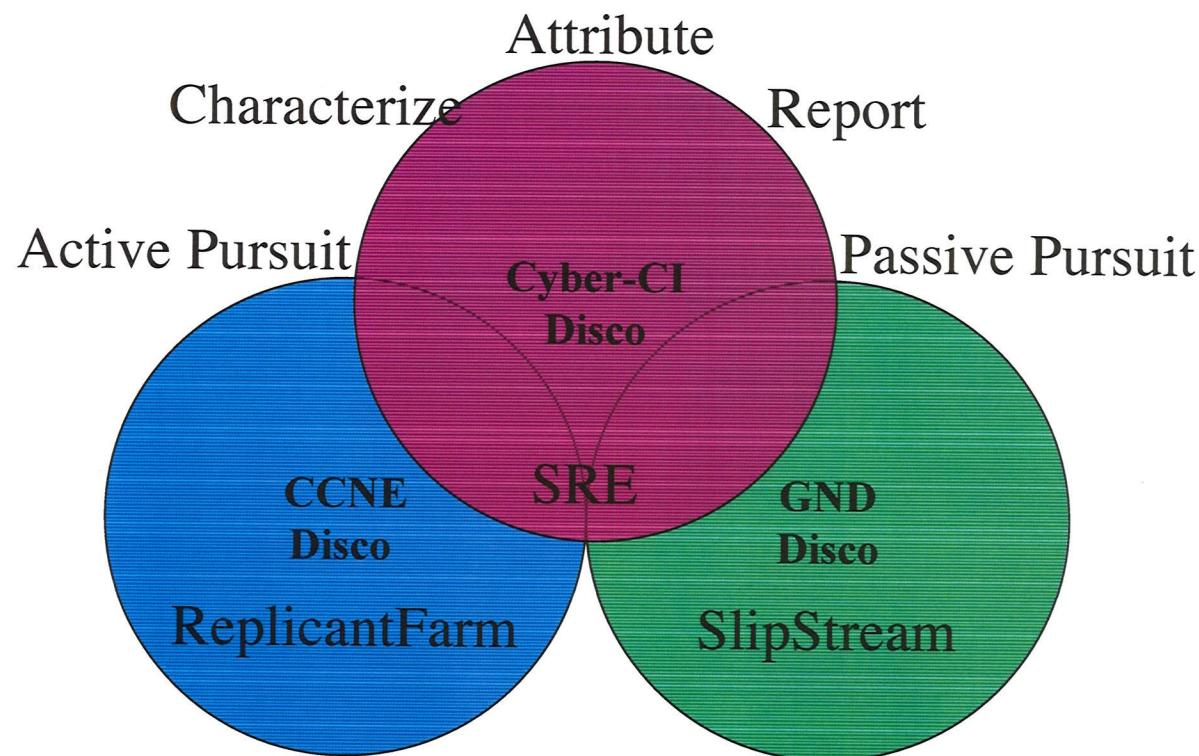


Cyber Counterintelligence (CNT1)

- Covert Network Threats (New Directorate within CSEC)
 - CNT1 (Cyber Counterintelligence)
 - CNT2 (Traditional Counterintelligence)
- CNT1 Mission
 - To produce intelligence on the capabilities, intentions and activities of Hostile Intelligence Services to support Counterintelligence activities at home and abroad.
- Fusion of Cyber Analytic Skills with Traditional Counterintelligence Analytic Skills
 - All Cyber-Counterintelligence Investigations *should* lead to Traditional Counterintelligence investigations.



CSEC SIGINT CCI Discovery



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CSEC CNE (K) - WARRIORPRIDE

- WARRIORPRIDE (WP):
 - Scalable, Flexible, Portable CNE platform
 - Unified framework within CSEC and across the 5 eyes
 - WARRIORPRIDE@CSE/etc. == DAREDEVIL@GCHQ
 - xml command output to operators
- Several plugins used for machine recon / OPSEC assessment
Several WP plugins are useful for CCNE:
 - Slipstream : machine reconnaissance
 - ImplantDetector : implant detection
 - RootkitDetector : rootkit detection
 - Chordflier/U_ftp : file identification / retrieval
 - NameDropper : DNS
 - WormWood : network sniffing and characterization



K0G – ReplicantFarm

- Created to leverage the WP XML output in a meaningful way
- Module based parser/alert system running on real-time CNE operational data
- Custom/module based analysis:
 - Actors
 - Implant technology
 - Host based signatures
 - Network based signatures



REPLICANTFARM generic modules

- Cloaked
- Recycler
- Rar password
- Tmp executable
- Packed
- Peb modification
- Privileges
- MS pretender
- System32 “variables”
- Strange DLL extensions
- Kernel cloaking
- Schedule at
- Ntuninstall execution
- hidden

Other ideas....



Generic modules : example

```
my @runningProcs = xml_isProcessRunning( $xml, 'svchost.{1,3}\*.exe',
                                         'winlogon.{1,3}\*.exe',
                                         'services.{1,3}\*.exe',
                                         'lsass.{1,3}\*.exe',
                                         'spoolsv.{1,3}\*.exe',
                                         'autochk.{1,3}\*.exe',
                                         'logon.{1,3}\*.scr',
                                         'rundll32.{1,3}\*.exe',
                                         'chkdsk.{1,3}\*.exe',
                                         'chkntfs.{1,3}\*.exe',
                                         'logonui.{1,3}\*.exe',
                                         'ntoskrnl.{1,3}\*.exe',
                                         'ntvdm.{1,3}\*.exe',
                                         'rdpclip.{1,3}\*.exe',
                                         'taskmgr.{1,3}\*.exe',
                                         'userinit.{1,3}\*.exe',
                                         'wscntfy.{1,3}\*.exe',
                                         'tcpmon.{1,3}\*.dll' );
```

```
foreach my $runningProc (@runningProcs)
{
    $alertText .= "Suspicious process detected, legitimate exe named appended with string: ".
    $runningProc . "\n";
```

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CCNE/Opsec WPID Alerts - Mozilla Firefox

File Edit View History Bookmarks Tools Help

Most Visited Getting Started Latest Headlines LTT < Operations < TW... Opsec - k1svn - Trac CCNE/Opsec Systems http://obelix/systemInfo/ CCNE/Opsec WPID Alerts Exploits CCNE/Opsec WPID Alerts CCNE/Opsec WPID Alerts

CCNE/Opsec WPID Alerts

REPLICANTFARM

Note that the search is done with the fields as perl regular expressions...

Examples:

- Dots (.) are single-character wildcards
- Dot-Star (*) means any number of characters
- Single WPID: 51\8.1.13
- Class C WPID: 51\8.1.
- Infrastructure: ^50.

Current Modules:

mod_100_WH_Implant.pl	mod_1100_VO_Implant.pl	mod_15_procParents.pl	mod_200_SD_MI20.pl	mod_24_expectedArguments.pl	mod_304_UNK_WINPACP.pl	mod_310_UNK_WIDOWKEY.pl
mod_100_MM_SHEPHERD.pl	mod_11_cloaked.pl	mod_16_recyclerexec.pl	mod_201_SD_MI25FTP.pl	mod_25_privileges.pl	mod_305_UNK_IASEX.pl	mod_311_UNK_CIVETCAT.pl
mod_101_MM_CARBON.pl	mod_1200_AF_ALOOFNESS.pl	mod_17_tmpexecl.pl	mod_20_pdbmodification.pl	mod_300_UNK_TCPSRV32.pl	mod_306_UNK_WINUPDATE.pl	mod_312_UNK_DIESELRATTLE.pl
mod_102_MM_REGBACKUP.pl	mod_12_system32var.pl	mod_18_passwordfilters.pl	mod_21_scheduleat.pl	mod_301_UNK_BLAZINGANGEL.pl	mod_307_UNK_QUIVERINGSQUAB.pl	mod_313_UNK_SHARP.R.pl
mod_103_MM_DOGHOUSE.pl	mod_13_rarpassword.pl	mod_19_kernelcloaking.pl	mod_22_ntunistallexec.pl	mod_302_TINYWEB.pl	mod_308_UNK_WINDO.pl	mod_400_SS_WINBEE.pl
mod_104_MM_WALKER.pl	mod_14_strangledlentensions.pl	mod_1_packed.pl	mod_23_hidden.pl	mod_303_UNK_CYDLL.pl	mod_309_UNK_DIESELRATTLE.pl	mod_401_SS_SSLINST.pl
						mod_402_SS_SharpR.pl

WPID Regexp:

Module Regexp: MM

Type: Historic Live

Submit Query

ALERTS

[REDACTED]	Module: mod_103_MM_DOGHOUSE.pl	Date: 2010-01-21T15:36:39.968	Tag: MM	File name: ..\datastore\archive\2010\01\21\15 /TXID000027485_18_Y2010M01D21_H15M28S59_MS642MU500NS0_RXID050_000_0
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Details:

Possible MM DOGHOUSE driver file: C:\WINNT\SNtUninstallQ244598\\$.
Possible MM DOGHOUSE driver file: C:\WINNT\SNtUninstallQ244598\$\afd.sys.
Possible MM DOGHOUSE driver file: C:\WINNT\SNtUninstallQ244598\$\netbt.sys.
Possible MM DOGHOUSE driver file: C:\WINNT\SNtUninstallQ244598\$\tcpip.sys.
Possible MM DOGHOUSE driver file: C:\WINNT\SNtUninstallQ244598\$\\hotfix.inf.

--PULLEDPOK--



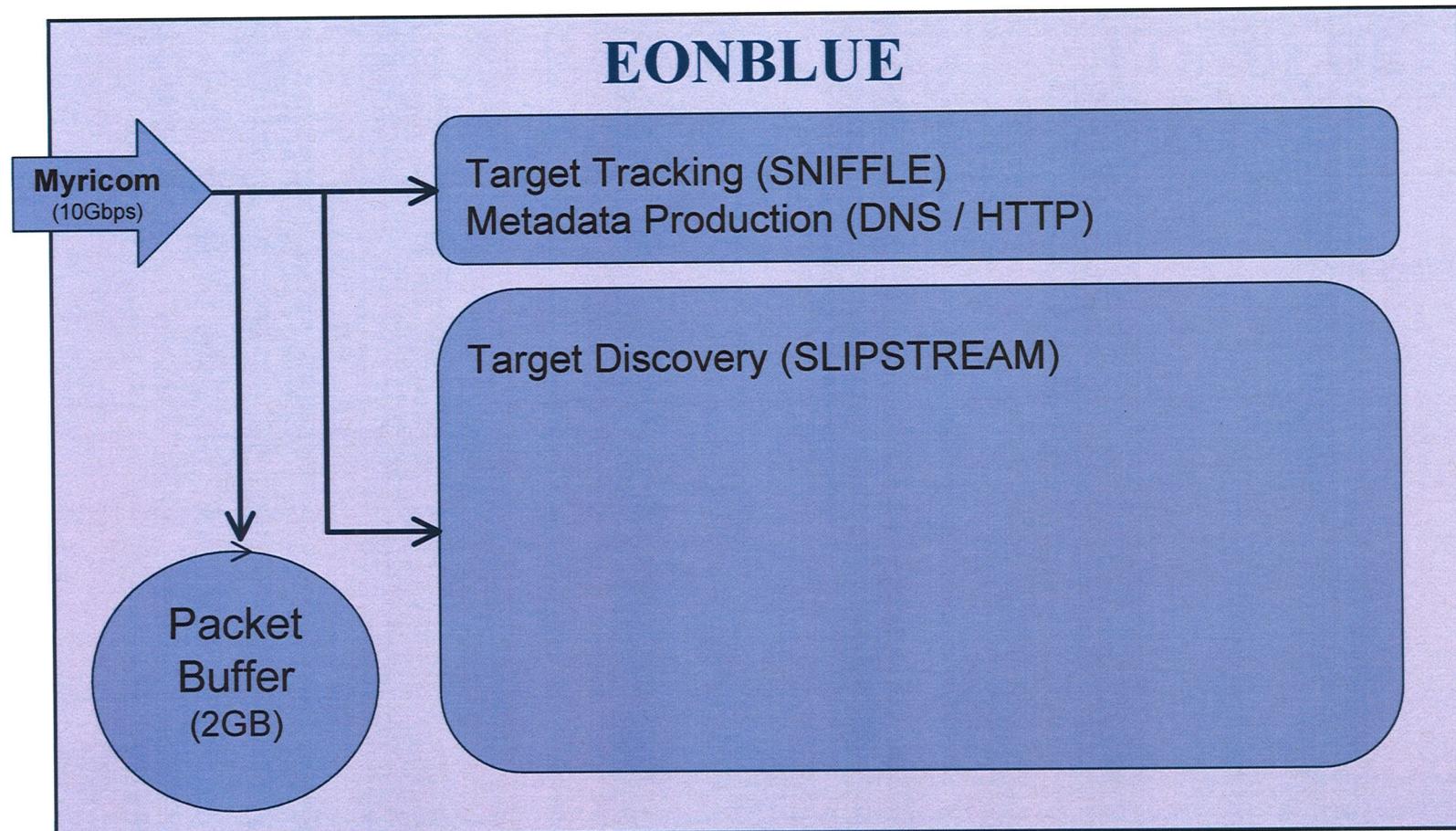
EONBLUE

- CSEC cyber threat detection platform
- Over 8 years of development effort
- Scales to backbone internet speeds
- Over 200 sensors deployed across the globe

Track
Known
Threats

Discover
Unknown
Threats

Defence at
the core of
the Internet



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Anomaly Detection Tools

- There are currently over 50 modules in Slipstream
 - RFC Validation
 - Heuristic Checks
 - Periodicity
 - Simple Encryption
 - Streaming Attack Detection
 - Analyst Utilities
- Not all of these tools are ‘YES/NO’, some will require some work.



Heuristic Example

- QUANTUM

- It's no lie, quantum is cool.
 - But its easy to find
- Analyze first content carrying packet
 - Check for sequence number duplication, but different data size
 - If content differs within the first 10% of the pkt payload, alert.



What's Next?

- Anomaly Discovery at scale
 - Multi-10G anomaly detection
- Cross Agency communication of anomalies
 - Sometimes signatures aren't enough
- DONUTS!
 - Everyone likes them:
 - [REDACTED]
 - 5-eyes accessible DONUTS
 - Discovery of New Unidentified Threats
 - CSEC / GCHQ right now

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Global Access Roadmap supporting SRSG and WISDEN Scenarios

Topic	Desired Outcomes	#	Activity	Calendar Year: 2010		Calendar Year 2011			
				July - Sep (Q3)	Oct - Dec (Q4)	Jan - Mar (Q1)	Apr - Jun (Q2)	July - Sep (Q3)	Oct - Dec (Q4)
Metadata Sharing	- Shared Situational Awareness	M.1	Bulk daily sharing of Cyber Event Metadata with 5-						
	- Assess value of metadata sharing	M.2	Receive Metadata from partner agencies						
	- Develop Use-Cases for Sharing	M.3	Report on value of metadata sharing						
	- Develop Requirements for NRT tipping	M.4	Instrument NRT sharing of CSEC Cyber Event Metadata						
		M.5	Report on NRT sharing (value / lessons learned / reqt's)						
		M.6	Enrich NRT feed with Geolocation / ASN						
		M.7	Add Impact information to event metadata						
		M.8	Extend Deadsea Live feed from CSEC to GCHQ						
		M.9	Receive FastFlux metadata (tip) b/w GHQ/CSEC (see T.6/T.7)						
Signatures and Target Knowledge	- Replace current Signature Management system	S.1	Replace existing signature management with HalterHitch						
	- Impacts to support Action on / Cueing and enhance Metadata feed	S.2	Implement Impacts with DGI for Signatures (re-enter in HH)						
	- Provide context to metadata	S.3	Decommission current targeting process and replace with HH						
	- Experiment with TKB to gather requirements	S.4	Report on HH (value / lessons learned / requirements / etc)						
	- Create baseline of Cyber knowledge	S.5	Open SIGINT HH repository to ITS for Signature Sharing						
		S.6	Open SIGINT HH repository to 5-eyes to retrieve signatures						
		S.7	Trial nSpaces with CTEC / TAC / NAC / DGI						
		S.8	Report on value of nSpaces to support Target Knowledge						
		S.9	Set-up Collaborative Web Environment						
Sharing Cyber Content	- Create a shared environment to experiment with content sharing	C.1	Establish Cyber Play-Pen						
	- Develop requirements / lessons learned on sharing content	C.2	Upgrade EONBLUE for use in Cyber Play-Pen						
	- Illustrate equitable processing in Cyber capability	C.3	Assist in porting EONBLUE capability to PPF						
	- Trial XKS for content sharing built on existing metadata	C.4	Promote EONBLUE / PPF content to shared XKS						
		C.5	Evaluate retrieving GHQ content based on events from XKS						
		C.6	Trial feeding EONBLUE events at CSEC to a local XKS						
		C.7	Evaluate opening CSEC Cyber-XKS to GCHQ						
		C.8	Expose CSEC Cyber-XKS Interface to 5-eyes						
		C.9	Report on content sharing experiments						
Tipping and Cueing	- Leverage EONBLUE's native messaging to extend national capability (within SIGINT / with ITS)	T.1	Send EONBLUE cue's across Canadian SSO Sites						
	- Based on existing bilateral partnerships trial tipping / cueing to enhance content sharing / metadata sharing	T.2	Send EONBLUE cue's between Canadian Passive Programs						
	- Cue International EONBLUE and similar components with FASTFLUX as trial	T.3	Instrument Cyber Session Collection Domestically						
	- Tip in NRT SIGINT events related to partner countries	T.4	Send tips on GoC activity to IT Security						
		T.5	Send EONBLUE cue's from Canadian SSO to ITS Sensors						
		T.6	Introduce and develop Cyber Session Collection Experiment						
		T.7	Tip FASTFLUX events from CSEC to GCHQ						
		T.8	Extend EONBLUE FastFlux cue's to GCHQ FastFlux Software						
		T.9	Receive cue's from GCHQ's FastFlux Software at EONBLUE						
		T.10	Make FASTFLUX tips available to other 5-eyes agencies						
		T.11	Tip in NRT EONBLUE messages to 5-eyes based on IP-Geo						

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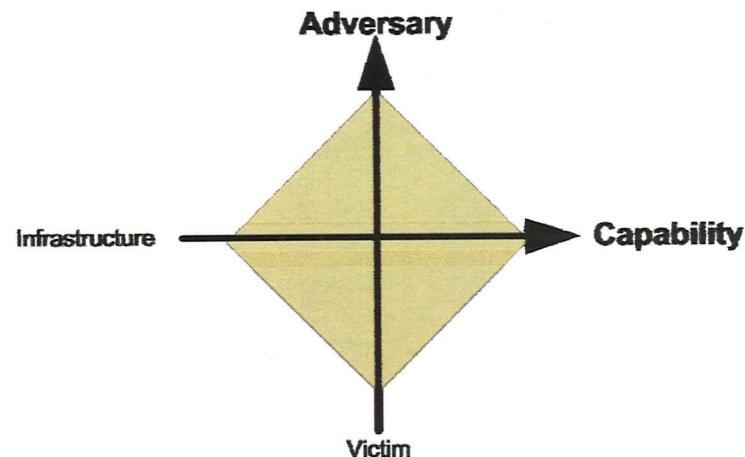
CNT1 - Analysis

- Triage leads from K0G and GA4
 - Links to existing intrusion sets?
- Pursue interesting leads
 - Passive SIGINT collection
 - Technical analysis
- Produce reporting
- Attribute



Analytic Approach

1. Begin with lead
2. Apply to SIGINT
3. Apply to CCNE
4. Track, research and report
5. Generate persona lead
6. Coordinate with traditional CI





Cyber-Specifics of the Analytic Approach

Network Traffic Analysis

- We have access to Special Source, Warranted and 2nd Party collection in raw, unprocessed form
- Work very closely with protocol and crypt analysts

Malware Analysis and Reverse Engineering

- Samples are received through passive collection and human sources

Forensic Analysis

- Assist traditional CI investigations and others

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CSEC Contacts

CCI (CNT1)

[REDACTED]
[REDACTED]@cse
[REDACTED]
[REDACTED]@cse
[REDACTED]
[REDACTED]@cse

CCNE (K0G)

[REDACTED]
[REDACTED]@cse
[REDACTED]
[REDACTED]@cse
[REDACTED]
[REDACTED]@cse

GND (GA4)

[REDACTED]
[REDACTED]@cse
[REDACTED]
[REDACTED]@cse

ioops@cse-cst.gc.ca

k0-ccne-dl@po.cse

ga4-staff@cse-cst.gc.ca

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