# SNOWGLOBE:

## From Discovery to Attribution

[redacted]

CSEC CNT / Cyber CI
SIGDEV 2011 Cyber Thread

# OVERVIEW

# Overview

- Discovery
- Development
- Victimology
- Attribution
- SNOWGLOBE.
- Questions and Comments

# DISCOVERY

- **Discovery**
- **Development**
- **Victimology**
- **Attribution**
- **SNOWGLOBE**
- **Questions**

# Discovery

- Discovered in November 2009
- Existing CNE Access
- WARRIORPRIDE as a sensor
  - REPLICANTFARM for anomaly detection
    - XML info from implant
    - Signature-based detection of anomalous activity and known techniques
    - Noticed: Command-line to create password protected RAR
      - Always the same password
- Retrieved files associated with activity
  - Identified unknown malware through reverse engineering
    - Collecting email from specific, targeted accounts
    - “Felt like” a FI-collecting tool
    - Pointed to first discovered LP
    - Provided intial comms analysis to allow signature deployment in passive collection

# DEVELOPMENT

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# Implant

- SNOWBALLs
  - Found and identified wmimgmt.exe and wmimgmt.dll (later called the SNOWBALL implant).
  - Creates a service → loads wmimgmt.exe → injects wmimgmt.dll into IE.
  - Later upgraded SNOWBALL to SNOWBALL 2
    - Very similar beaconing.
- SNOWMAN
  - More sophisticated implant, discovered mid-2010
  - Less is known about SNOWMAN, but efforts against it continue.

# SNOWBALL Beacons

| Content | Meaning/decrypt |
|---|---|
| crc= 491ffa2e746f2452608578761f6fbe02 | a 32-byte checksum |
| 4293 | beacon size in bytes |
| flag | Description field. Values can be: flag, segment, len |
| qKmP2amaqYHdl7GE99nZrY qjmpn9lb6346Kdp%2Fiw44<br>6rlKHkgpWjupDerZmyg5%2 FX7oWH3bfAmYvC1raLupS<br>M%2BqGeuP%2BV4eDk%2 F4S%2Fi7mYzLuQr4fe552O<br>gcWYrJiu2Iz6xO6uwqbbjou Z%2B9KlhNHAv5a1gd%2B<br>plcW94N%2FiyuLfh%2FrMl Y3CsdyOi5CmuYm80YXz7<br>oKN1qbAgZqQlKqFoILTqN 7mgdW%2FxYGBwpP2j6<br>%2BUu9Ctg8jGoseeh9% 2BY4sqansyziKqJn%2FO<br>b3c6YlbeHp5DCs4aqjYvn %2BL6n9dbuxOfKlo2NqN<br>uC7rjnutmbvYWihYz61% 2FDYgO%2FYhICZ%2F%<br>2BzS58Get4W%2Bwb3N 84Scw4L4hraE2LmM%2F<br>MiA8One3uzE6Nru0Yfo3v TRivSC4OT8l6ue953Xr4ql<br>gJD9ldzf7MTotuXBhuPE99 iK9IfX2oL70qe4ldPgxJWN<br>wrHcjouQ1qTK96PfvYyym 4rn9ImD2Zj4yqvRlo%2Blh<br>dKQiZqs47q%2FnND3wY 7r3PLIkOeV | Login/Domain (owner): SYSTEM/AUTORITE NT (user) Computer name: EXPORT Organization (country): (France) OS version (SP): 5.1 (Service Pack 3) Default browser: iexplore.exe IE version: Mozilla/4.0 (compatible; MSIE 6.0; Win32) Timeout: 3600(min)4800(max) First launch: 07\30\2009 12:29:37 Last launch : 11\20\2009 10:32:42 Mode: Service \| Rights: Admin \| UAC: N/A ID: 08184 |

User-Agent: Mozilla/4.0 (compatible; MSI 6.0; Windows NT 5.1; .NET CLR 1.0.3705; .NET CLR 1.1.4322)

# Passive Collection

- EONBLUE
  - Global Access capability deployed across collection programs, including SPECIALSOURCE and CANDLEGLOW (FORNSAT).
  - Provides passive cyber-threat detection.
  - Allowed us to find additional infrastructure by using signatures for known SNOWGLOBE beacons
- Traditional
  - As always, a huge asset
  - With passive access, we were able to see an operator log in to an LP
    - Single-token authentication + weak hash = breakthrough.
    - Seeing the operator log in provided enough to get into the LPs for ourselves.

# Infrastructure

- Most infrastructure hosted in FVEY nations
- US, Canada, UK, Czech Republic, Poland, Norway
- Two types of infrastructure:
  - Parasitic
    - outbase.php or register.php LP nested in a directory under root domain
    - Unsure if this infrastructure is acquired via exploitation, some sort of special-source access, or some combination of the two
    - This type seems to be found primarily, but not exclusively, on French-language sites
  - Free hosting
    - outbase.php or register.php LP directly under root

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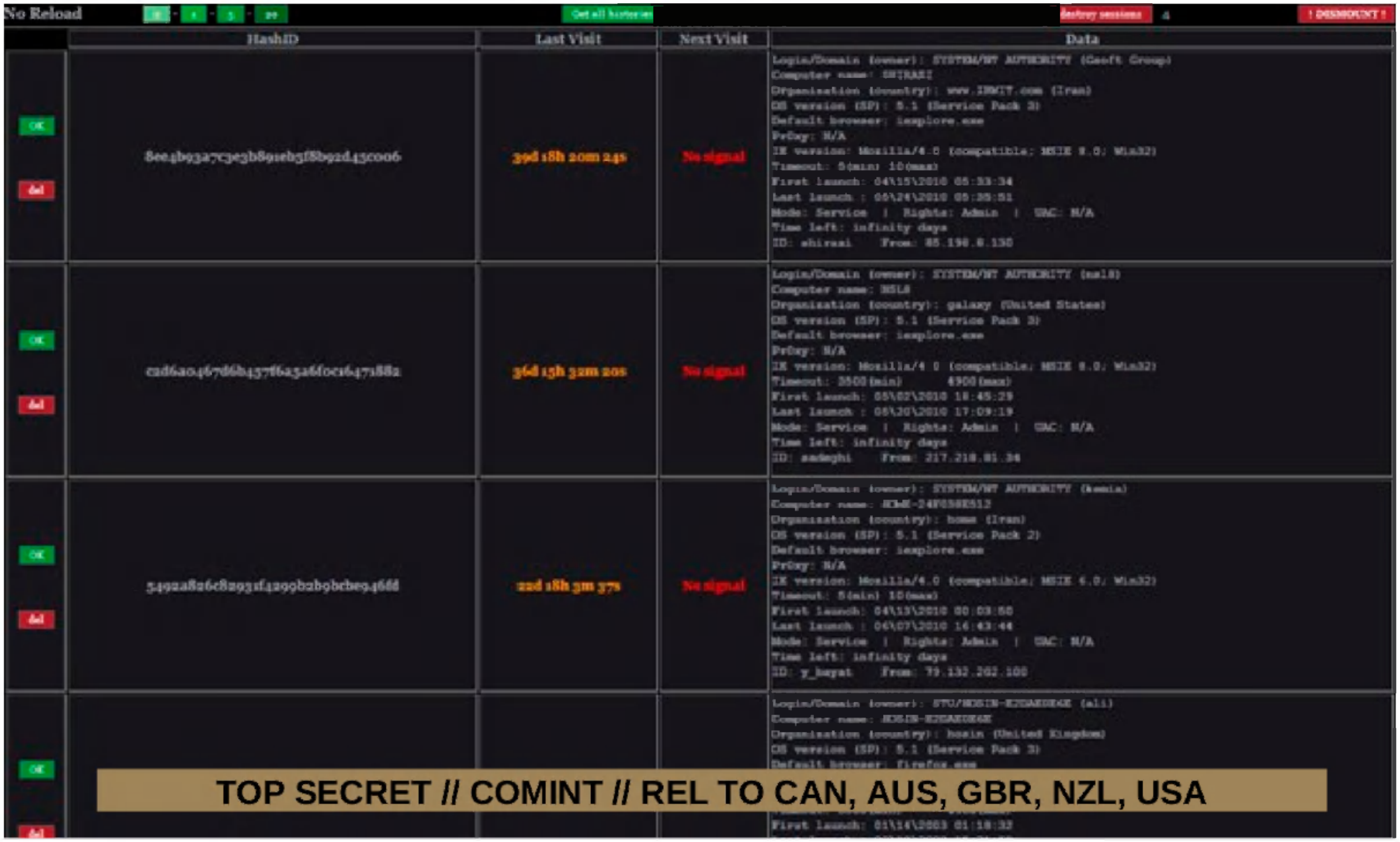
# Infrastructure: C2



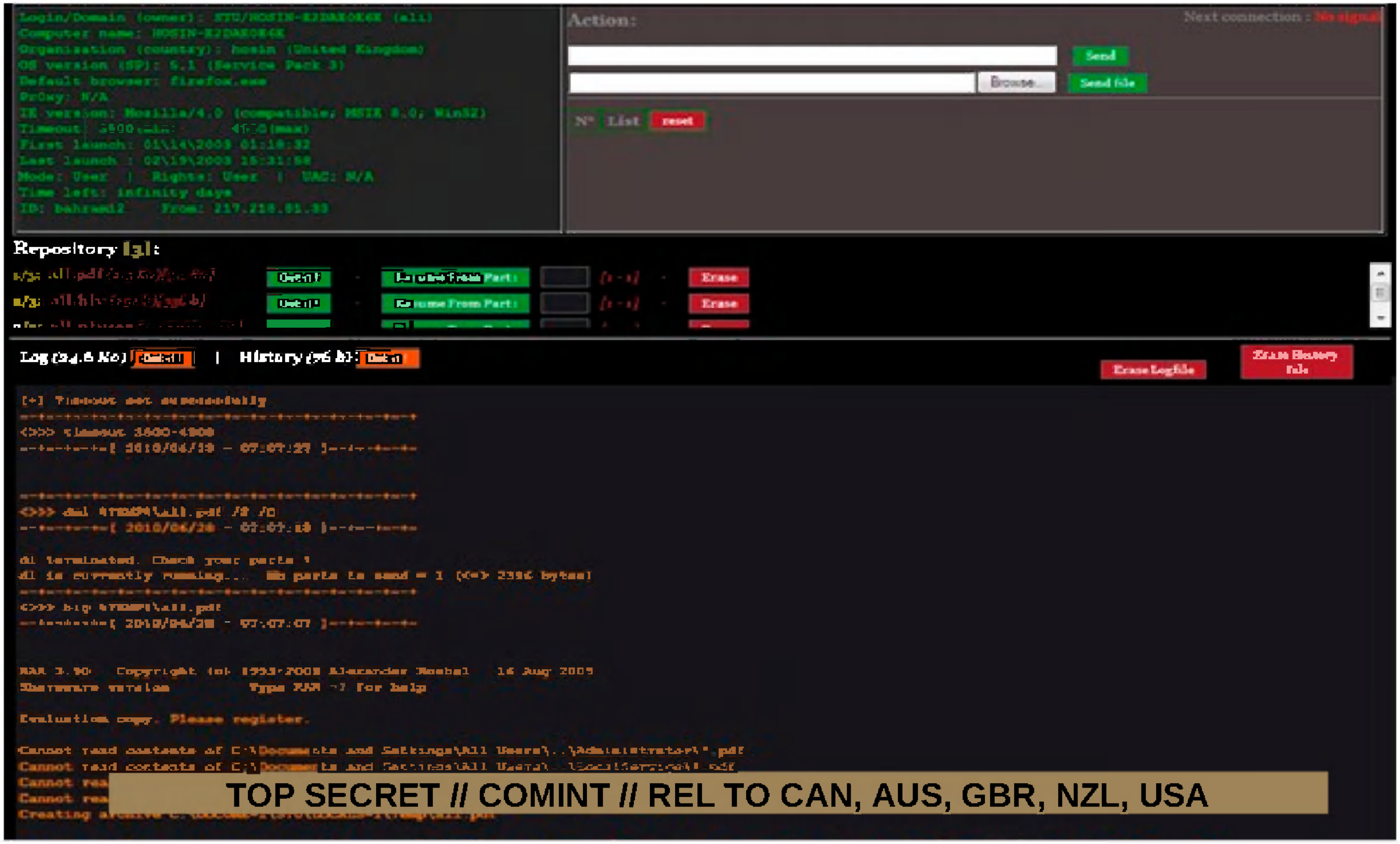
| | HashID | Last Visit | Next Visit | Data |
|---|---|---|---|---|
| OK<br>del | 8ee4b93a7c3e3b891eb5f8b92d45c006 | 39d 18h 20m 24s | No signal | Login/Domain (owner): SYSTEM/NT AUTHORITY (Geoft Group)<br>Computer name: SHIRAZI<br>Organization (country): www.IRNIT.com (Iran)<br>OS version (SP): 5.1 (Service Pack 3)<br>Default browser: iexplore.exe<br>PrOxy: N/A<br>IE version: Mozilla/4.0 (compatible; MSIE 8.0; Win32)<br>Timeout: 5(min) 10(max)<br>First launch: 04\15\2010 05:33:34<br>Last launch : 05\24\2010 05:35:51<br>Mode: Service \| Rights: Admin \| UAC: N/A<br>Time left: infinity days<br>ID: shirazi From: 85.198.6.130 |
| OK<br>del | c2d6a0467d6b4376a5a6f0c16471882 | 36d 15h 32m 20s | No signal | Login/Domain (owner): SYSTEM/NT AUTHORITY (mal8)<br>Computer name: HSL8<br>Organization (country): galaxy (United States)<br>OS version (SP): 5.1 (Service Pack 3)<br>Default browser: iexplore.exe<br>PrOxy: N/A<br>IE version: Mozilla/4 0 (compatible; MSIE 8.0; Win32)<br>Timeout: 3500(min) 4900(max)<br>First launch: 05\02\2010 18:45:29<br>Last launch : 05\20\2010 17:09:19<br>Mode: Service \| Rights: Admin \| UAC: N/A<br>Time left: infinity days<br>ID: sadeghi From: 217.218.81.34 |
| OK<br>del | 5492a826c8293f4299b2b9bcbe94688 | 22d 18h 3m 37s | No signal | Login/Domain (owner): SYSTEM/NT AUTHORITY (kamia)<br>Computer name: HOME-24F0S8E512<br>Organization (country): home (Iran)<br>OS version (SP): 5.1 (Service Pack 2)<br>Default browser: iexplore.exe<br>PrOxy: N/A<br>IE version: Mozilla/4.0 (compatible; MSIE 6.0; Win32)<br>Timeout: 5(min) 10(max)<br>First launch: 04\13\2010 00:03:50<br>Last launch : 04\07\2010 16:43:44<br>Mode: Service \| Rights: Admin \| UAC: N/A<br>Time left: infinity days<br>ID: y_bayat From: 79.132.202.100 |
| OK<br>del | | | | Login/Domain (owner): STU/HOSIN-E2DAEDE6E (ali)<br>Computer name: HOSIN-E2DAEDE6E<br>Organization (country): hosin (United Kingdom)<br>OS version (SP): 5.1 (Service Pack 3)<br>Default browser: firefox.exe<br>First launch: 01\14\2003 01:18:32 |

TOP SECRET // COMINT // REL TO CAN, AUS, GBR, NZL, USA

*Safeguarding Canada's security through information superiority*
*Préserver la sécurité du Canada par la supériorité de l'information*

Canada

# Infrastructure: C2



```
Login/Domain (owner): STU/HOSIN-E2DAE0K6K (all)
Computer name: HOSIN-E2DAE0K6K
Organisation (country): hosin (United Kingdom)
OS version (SP): 5.1 (Service Pack 3)
Default browser: firefox.exe
Proxy: N/A
IE version: Mozilla/4.0 (compatible; MSIE 8.0; Win32)
Timeout: 3600 (min)     4500 (max)
First launch: 01\14\2009 01:10:32
Last launch : 02\19\2009 15:31:58
Mode: User  |  Rights: User  |  UAC: N/A
Time left: infinity days
ID: bahrami2    From: 217.218.81.33
```

```
[+] Timeout set successfully
-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
<>>> timeout 3600-4500
--+--+--+-[ 2010/06/18 - 07:07:27 ]--+--+--+-


-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
<>>> del %TEMP%\all.pdf /F /Q
--+--+--+-[ 2010/06/28 - 07:07:18 ]--+--+--+-

dl terminated. Check your parts !
dl is currently running...  Nb parts to send = 1 (<=> 2396 bytes)
-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
<>>> big %TEMP%\all.pdf
--+--+--+-[ 2010/06/28 - 07:07:07 ]--+--+--+-


RAR 3.90   Copyright (c) 1993-2009 Alexander Roshal   16 Aug 2009
Shareware version         Type RAR -? for help

Evaluation copy. Please register.

Cannot read contents of C:\Documents and Settings\All Users\..\Administrator\*.pdf
Cannot read contents of C:\Documents and Settings\All Users\..\LocalService\*.pdf
Cannot rea
Cannot rea
Creating archive [illegible]
```

# VICTIMOLOGY

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*Safeguarding Canada's security through information superiority*
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# Victimology: Iran

- Iranian MFA
- Iran University of Science and Technology
- Atomic Energy Organization of Iran
- Data Communications of Iran
- Iranian Research Organization for Science Technology, Imam Hussein University
- Malek-E-Ashtar University

# Victimology: Global

- Five Eyes
  - Possible targeting of a French-language Canadian media organization
- Europe
  - Greece
    - Possibly associated with European Financial Association
  - France
  - Norway
  - Spain
- Africa
  - Ivory Coast
  - Algeria

# ATTRIBUTION

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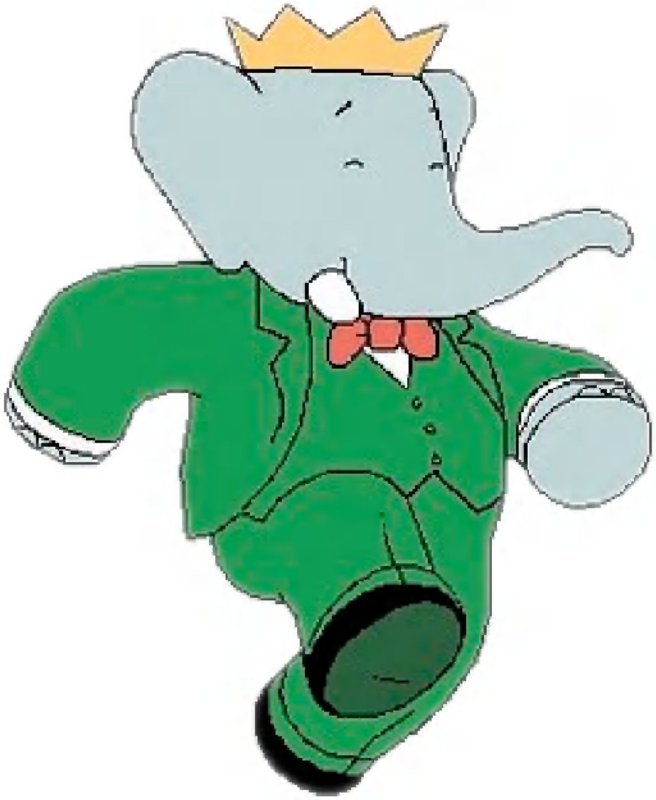
# Attribution: Binary Artifacts

- ntrass.exe
  - DLL Loader uploaded to a victim as part of tasking seen in collection
  - Internal Name: Babar
  - Developer username: titi
- Babar is a popular French children’s television show
- Titi is a French diminutive for Thiery, or a colloquial term for a small person



# Attribution: Language

- ko used instead of kB – a quirk of the French technical community
- English used throughout C2 interface, BUT phrasing and word choice are not typical of a native English speaker
  - An attempt at obfuscation?
- Locale option of artifact within spear-phishing attack set to "fr_FR"

# Attribution: Intelligence Priorities

- Iranian science and technology
  - Notably, the Atomic Energy Organization of Iran
  - Nuclear research
- European supranational organizations
  - European Financial Association
- Former French colonies
  - Algeria, Ivory Coast
- French-speaking organizations/areas
  - French-language media organization
- Doesn't fit cybercrime profile

# SNOWGLOBE.

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# SNOWGLOBE.

- CSEC assesses, with moderate certainty, SNOWGLOBE to be a state-sponsored CNO effort, put forth by a French intelligence agency

# SNOWGLOBE Program

- C2 nodes worldwide (including Canada, US, UK)
  - Free hosting
  - Compromised
- 3 implants
  - SNOWBALL 1
  - SNOWBALL 2
  - SNOWMAN
- Victims in Spain, Greece, Norway, France, Algeria, Cote d'Ivoire
  - Intense focus on Iranian science and technology organizations
- Likely French intelligence
  - Specific agency unknown

# What We Don't Know

- Any persona details
- How they get their non-free LPs
  - Exploitation?
  - Special source?
- Last hop (operator to infrastructure)
  - Believed to be Tor-based…
- Which agency within the French intelligence community might be responsible
  - Who's driving the intelligence requirements
- Efforts against the SNOWMAN crypt continue

# QUESTIONS AND COMMENTS

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