TIDE

THREAT IDENTIFICATION USING ACTIVE DNS MEASUREMENTS

ANNA SPEROTTO
a.sperotto@utwente.nl

OLIVIER VAN DER TOORN
o.i.vandertoorn@student.utwente.nl

ROLAND VAN RIJSWIJK-DEIJ
r.m.vanrijswijk@utwente.nl

MOTIVATION

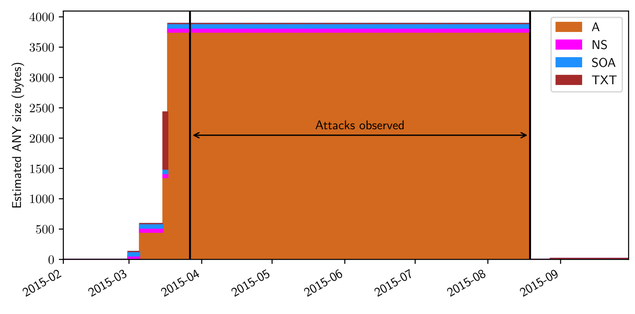
The **DNS** contains a wealth of information about the **security, stability and health of the Internet.** Most **research** that leverages the DNS for detection of **malicious activities** does so by **using passive measurements.** The **limitation** of this approach, however, is that it is effective **only once an attack is ongoing.** We, on the other hand, **advocate** the use of **active DNS measurements** for **pro-active** (i.e., before the actual attack) identification of **domains set up for malicious use.**

OPENINTEL

OpenINTEL is a **unique active DNS measurement platform** that **collects daily** active measurements of all second-level domains in **60% of the global DNS name space**, including the largest TLDs .com, .net and .org, and many country-specific TLDs, such as .nl, .se and .ru.

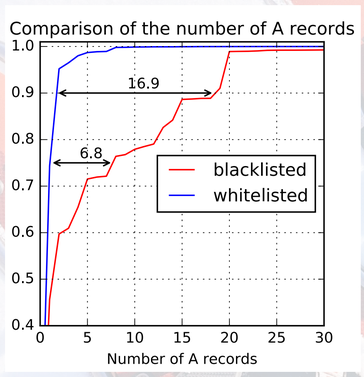
Data **collection started** in **2015,** providing us with a wealth of **longitudinal data** to **validate** our **approach.**

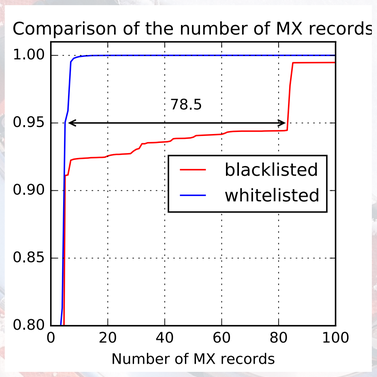
DENIAL OF SERVICE ATTACKS



An effective way for achieving DNS amplification DDoS attacks is to use a domain under the control of the attacker himself. We observe such attack domains in the making **before they are used in attacks.**

SNOWSHOE SPAM





In snowshoe spam, attackers distribute the load of spam among a large set of sources, to evade detection based on reputation (e.g. blacklists). Snowshoe spam is therefore **notoriously difficult to detect.**

CEO FRAUD

	#Domains sharing a specific Office 365 token												
	August						September						
TLD	26	27	28	29	30	31	1	2	3	4	5	6	7
.com	36	36	77	77	199	259	306	334	334	352	352	394	404
.net	-	2	2	2	17	17	20	38	43	43	44	54	54
.org	-	15	15	15	18	18	23	23	26	26	28	28	28
Total	**36**	**53**	**94**	**94**	**234**	**294**	**349**	**395**	**403**	**421**	**424**	**476**	**486**

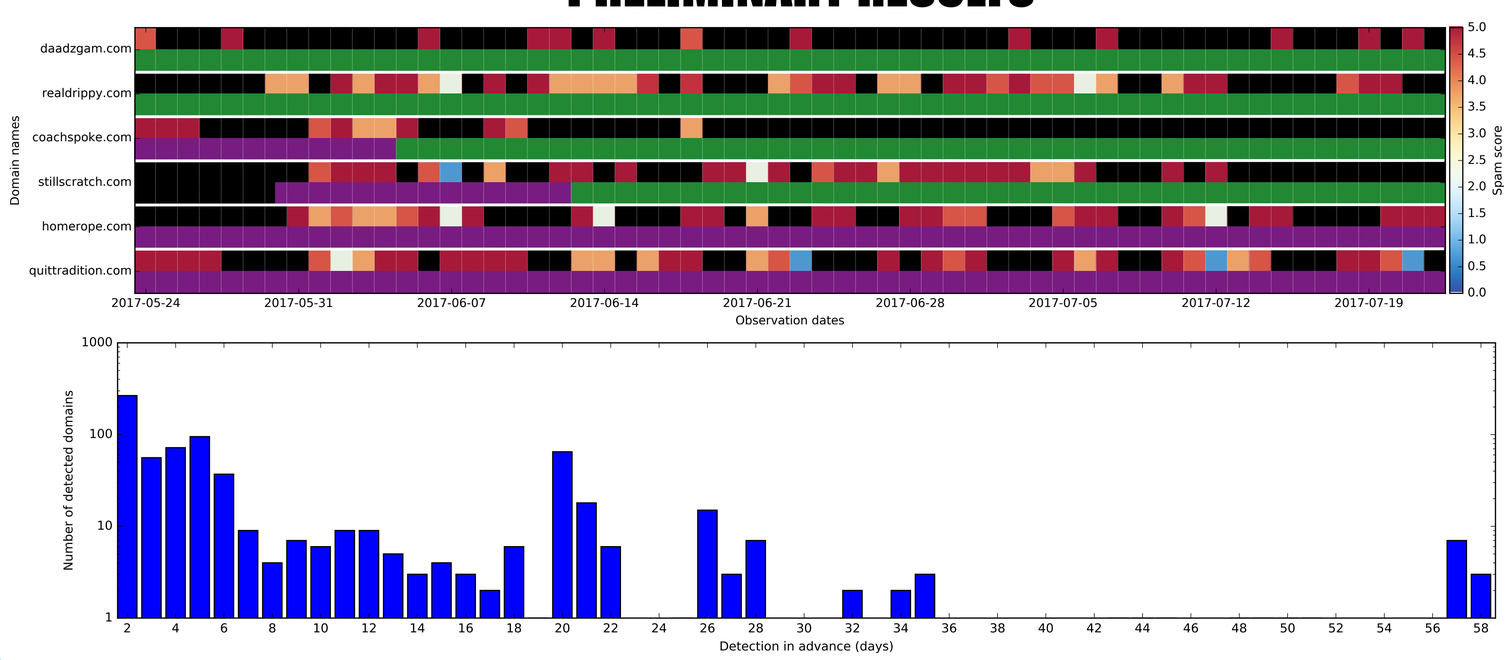
This example shows a case of CEO fraud against the Dutch higher education sector. Domains used to send target phishing mails shared a common token stored in DNS. Using OpenINTEL data, we **uncovered 61% more domains** than found in an initial sweep by the security community.

APPROACH

We are currently working on ways to **efficiently detect snowshoe spam** using data from the OpenINTEL platform, and have developed a **prototype** that we are running in an **operational environment.**

Using **machine learning** techniques, we **detect** snowshoe spam domains in the **long tail** of the OpenINTEL dataset. We generate an **RBL** based on the output of this process and feed this against a **live e-mail detection** system that processes approximately **ten million e-mails per day.**

PRELIMINARY RESULTS



SIDN fonds
UNIVERSITY OF TWENTE.
SURFNET

Scan QR for paper