

Domain Abuse Activity Reporting (DAAR) System

Report on data from 31 December 2019

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Executive Summary

This 31 December 2019 report from the Domain Abuse Activity Reporting (DAAR) system considers 202,730,298 resolving domain names from 1135 generic Top-Level Domains (gTLDs), in comparison to 201,163,135 domains in 1176 gTLDs reported on 30 November 2019. The reputation feeds the DAAR system employs reported at least one security threat in 368 of the 1135 gTLDs as of 31 December 2019 in comparison to 382 of the 1176 gTLDs identified on 30 November 2019. As a result, this report provides an analysis for only the 202,065,930 domains within the 368 gTLDs with at least one security threat.

Approximately 86 percent of the resolving domain names were in gTLDs launched before 2010 (referred to hereafter as "Legacy gTLDs"). Of the 661,399 domains identified as security threats, 429,045 or 64.87 percent were in legacy gTLDs. The other 232,354 or 35.13 percent were in the new gTLDs. In the November 2019 report, of 741,776 total domains identified as security threats 479,992 domains or 64.71 percent in legacy gTLDs and 261,784 domains or 35.29 percent in new gTLDs. This represents an approximate change of 0.16 percent in the number of security threat domains identified in legacy gTLDs.

Domains identified as security threats are not uniformly distributed across the gTLDs analyzed in this report. In the case of new gTLDs, 90 percent of the domains identified as security threats were in just 27 of those gTLDs. In the case of legacy gTLDs, 90 percent of the security threat domains were in just 2 of those gTLDs.

Preface

This monthly report to the ICANN Board of Directors highlights activities reported in the Domain Abuse Activity Reporting (DAAR) System, providing a snapshot as of 31 December 2019. The DAAR system studies domain name registration and security threat behavior across top-level domain (TLD) registries. This is a point-in-time report that includes data for all TLDs for which data was available. The report provides aggregated statistics and timeseries analysis about security threats of interest to DAAR¹ reported. In other words, this report provides analysis on domains that were identified as a security threat on 31 December 2019 only. While no single snapshot can capture trends or anomalies, historical data collected over time will show trends and can be used to identify anomalies for further study. For more information regarding data used in the DAAR monthly report check DAAR Context Document [1].

The overarching purpose of DAAR is to give the ICANN community reliable, persistent, and unbiased data using an open and community-vetted methodology that can be used to help inform policy discussions. To learn more about DAAR, visit the ICANN Domain Abuse Activity Reporting web page [2].

At this juncture, DAAR provides aggregated monthly gTLD registry reports only. Reporting about registrar portfolios requires domain name registration data to identify which domains are sponsored by which registrars. A collection system that will collect and analyze the necessary registrar data remains under development. We expect to add registrar reporting in future reports. Inclusion of country code TLD (ccTLD) registries, where the ccTLD registry information is voluntarily provided by the ccTLD administrator, is also planned for future releases.

¹The security threats of interest to DAAR for this report are: spam, phishing, malware distribution, and botnet command and control.

1 General Trends in New and Legacy TLDs

On 31 December 2019, DAAR collected zone data for legacy and new generic top-level domains (gTLDs)². The table below summarizes the data captured on 31 December 2019 and indicates the changes from the data reported for the previous month.

Table 1: Monthly snapshot comparison

	Domains for which DAAR is collecting data		Domains for which one or more security threat incidents	
	TLDs	Resolving domains in those gTLDs	TLDs	Resolving domains in those gTLDs
30 November 2019	1176	201,163,135	382	200,596,946
31 December 2019	1135	202,730,298	368	202,065,930
+/- changes from previous month	-41	1,567,163	-14	1,468,984

As Figure 1 displays, approximately 86 percent of gTLD domain names were registered in legacy gTLDs launched before 2010³. Figure 2 shows that the distribution stays more or less similar over time.

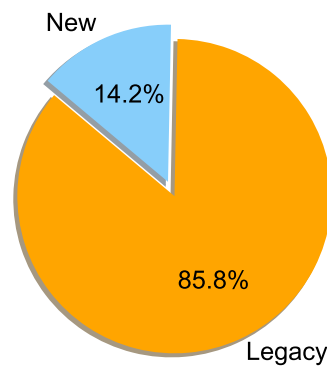


Figure 1: Distribution of resolving gTLD domains in zone files

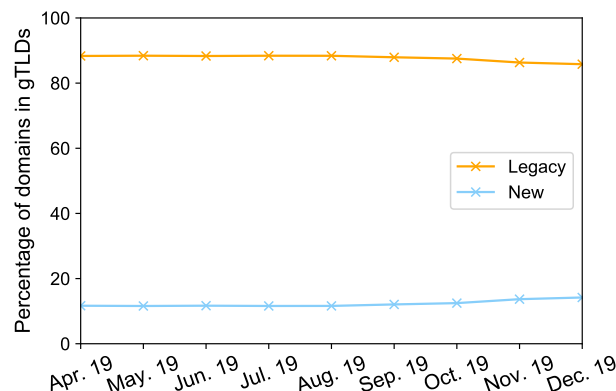


Figure 2: Distribution of resolving gTLD domains in zone files overtime

² While DAAR can support analysis on country code TLDs (ccTLDs), at this time, no ccTLDs are included in DAAR reports.

³ Certain legacy TLDs – specifically INT, EDU, MIL, GOV, and ARPA – do not appear in DAAR because they are not under ICANN gTLD contract and as such, zone data from these TLDs has not been included.

1.1 Distribution of Domains Identified as Security Threats

Figure 3 illustrates the proportion of domains identified as security threats in percentages in legacy and new gTLDs. Of the 661,399 domains identified as security threats, 429,045 or 64 percent were in legacy gTLDs, and 232,354 or 35 percent were in the new gTLDs. Figure 4 displays this proportion overtime.

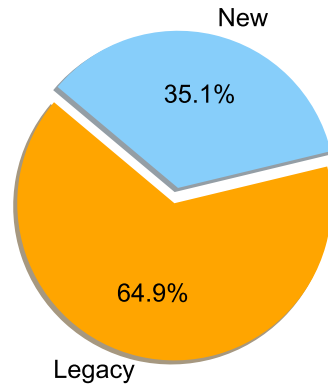


Figure 3: Distribution of domains identified as security threats

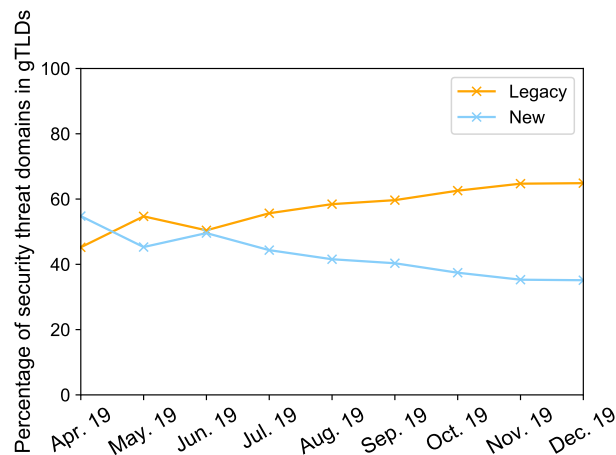


Figure 4: Distribution of domains identified as security threats over time

Domains identified as security threats in gTLDs are not uniformly distributed, either in the legacy or new gTLDs. The following graphs provide the cumulative distribution of domains reported as security threats for the legacy gTLDs and the new gTLDs respectively. Note that given the number of new gTLDs is many times larger than the legacy gTLDs, the X-axes of the two graphs are significantly different. As can be seen from Figure 5a, of the 232,354 domains identified as security threats reported in 352 new gTLDs:

- 40 percent were in the 3 most-exploited new gTLDs.
- 60 percent were in the 7 most-exploited new gTLDs.
- 80 percent were in the 15 most-exploited new gTLDs.
- 90 percent were in the 27 most-exploited new gTLDs.

For legacy gTLDs, Figure 5b displays the distribution of domains identified as security threats across legacy gTLDs. 1 legacy gTLD alone is responsible for 79 percent of domains identified as security threats and in total 2 legacy gTLDs bare more than 86 percent of all domains identified as security threats.

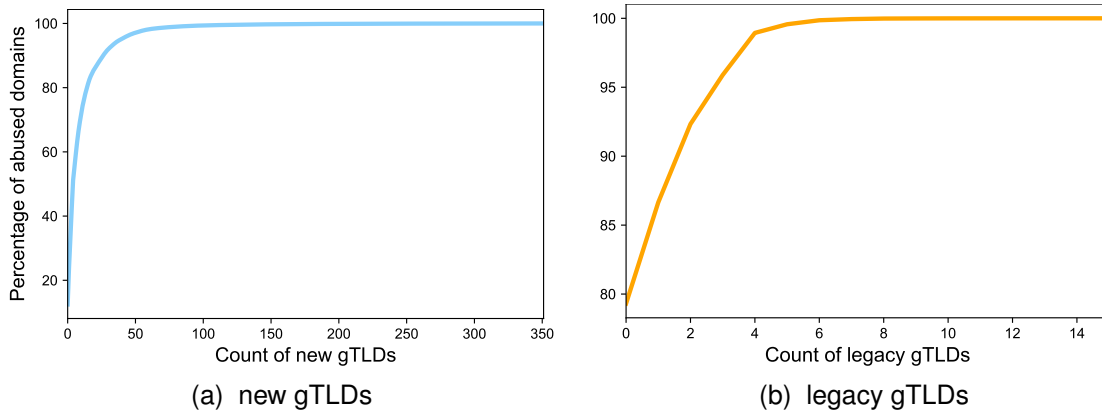


Figure 5: Cumulative distribution of domains identified as security threats

Finally, the total amount of domains used for security threats is not the same over time. Figure 6 displays the total number of domains identified as security threats over time across legacy and new gTLDs.

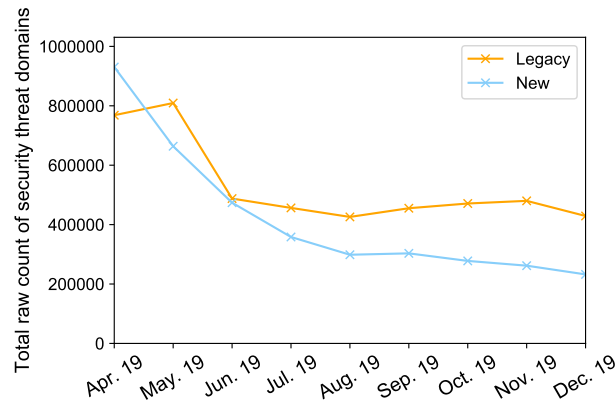


Figure 6: Total number of domains identified as security threats over time

2 Breakdown of Individual Security Threats

DAAR uses DNS Reputation Provider feeds to identify domain names reported to be associated with four kinds of security threats: phishing, malware distribution, botnet command-and-control, and spam. Figure 7 displays the breakdown of security threats from the DNS reputation data DAAR is utilizing⁴.

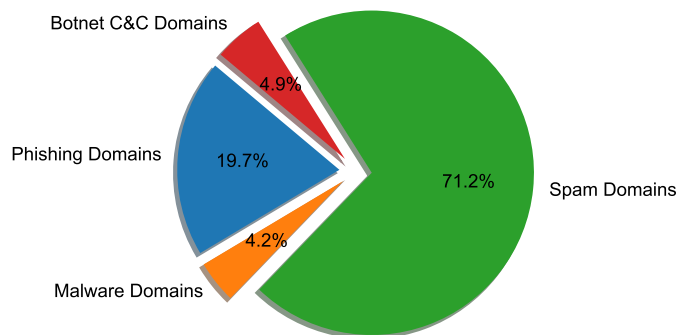


Figure 7: Breakdown of domains identified as security threats across all DAAR threat types

⁴ The list of DNS Reputation Providers DAAR used for the generation of this report is included in the Appendix.

Figure 8 shows the distribution of security threats across new and legacy gTLDs for these four threat types and figure 9 captures that over time.

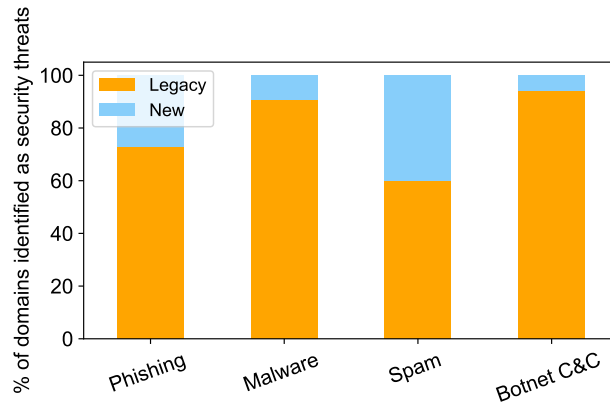


Figure 8: Proportion of domains identified as security threats within gTLD types

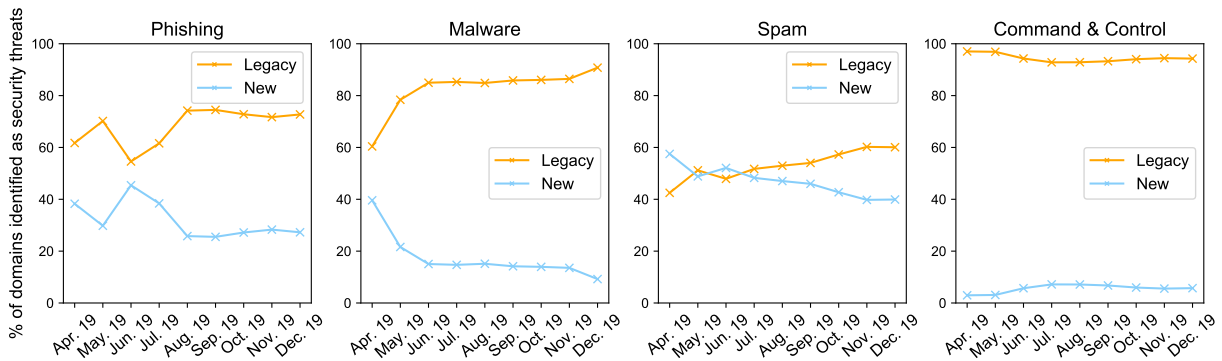


Figure 9: Proportion of domains identified as security threats within gTLD types over time

3 Normalized Metric: Percentage of Abuse

Figure 10 demonstrates the raw counts of domains identified as security threats (y-axis) versus domains resolved in gTLD zone files (x-axis). We use a logarithmic scale for the x-axis and y-axis to assist in visualizing the diverse counts of these two variables.

Raw counts of domains identified as security threats do not necessarily reflect the extent to which a gTLD is the focus of exploitation by security threat actors, since each gTLD has different number of domains registered. For this reason, we calculate a normalized value, a percentage of abuse (P_{ab}). P_{ab} represents the percentage of domains that are listed for being a security threat in at least one of the DNS Reputation feeds DAAR utilizes, normalized by the amount of resolving domains within a given gTLD. For gTLDs, P_{ab} is determined as follows:

$$P_{ab} = \left(\frac{\text{Number of domains identified as security threats in TLD}}{\text{Number of resolving domains within TLD zone}} \right) \times 100$$

P_{ab} can be used to provide “apples to apples” comparisons for the number of resolving domains that are identified as security threats over time or between gTLDs. This information could help the TLD operators determine whether their anti-abuse measures are effective as well as help the ICANN community in making informed policy decisions regarding security threat mitigation.

The average P_{ab} for all 1135 gTLDs in DAAR for December 2019 is approximately 0.35 percent. Figure 11 illustrates the P_{ab} in these gTLDs. Circle size indicates the non-normalized (raw) count of domains identified as security threats.

Additionally, Figure 12 displays the average P_{ab} across different gTLD types over time.

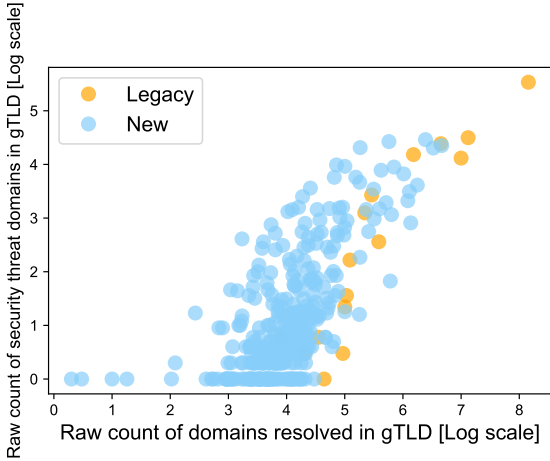


Figure 10: Raw counts of domains identified as security threat versus counts of resolved domains in gTLDs

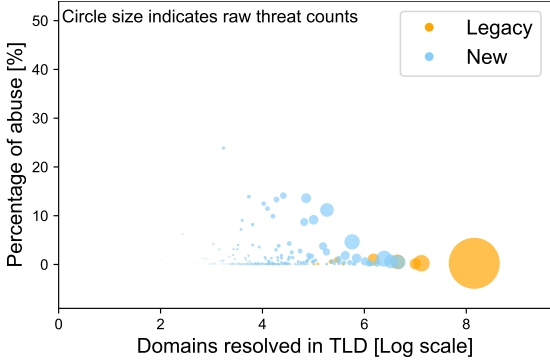


Figure 11: Percentage of abuse for domains identified as security threats vs. counts of domains resolved in gTLDs

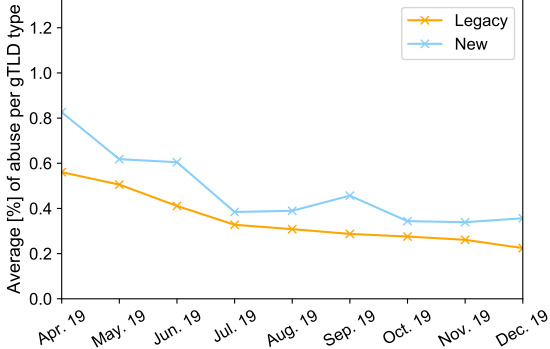


Figure 12: Percentage of abuse for different gTLD types over time

4 Percentage of Abuse: Breakdown of Individual Security Threats

Figure 13 displays Percentage of abuse for domains identified as security threats versus domains resolved in new and legacy gTLDs for each of the security threats of interest to DAAR. Each dots represents a gTLD provider. The bigger the size of the circle the higher the absolute count of domains identified as security threats.

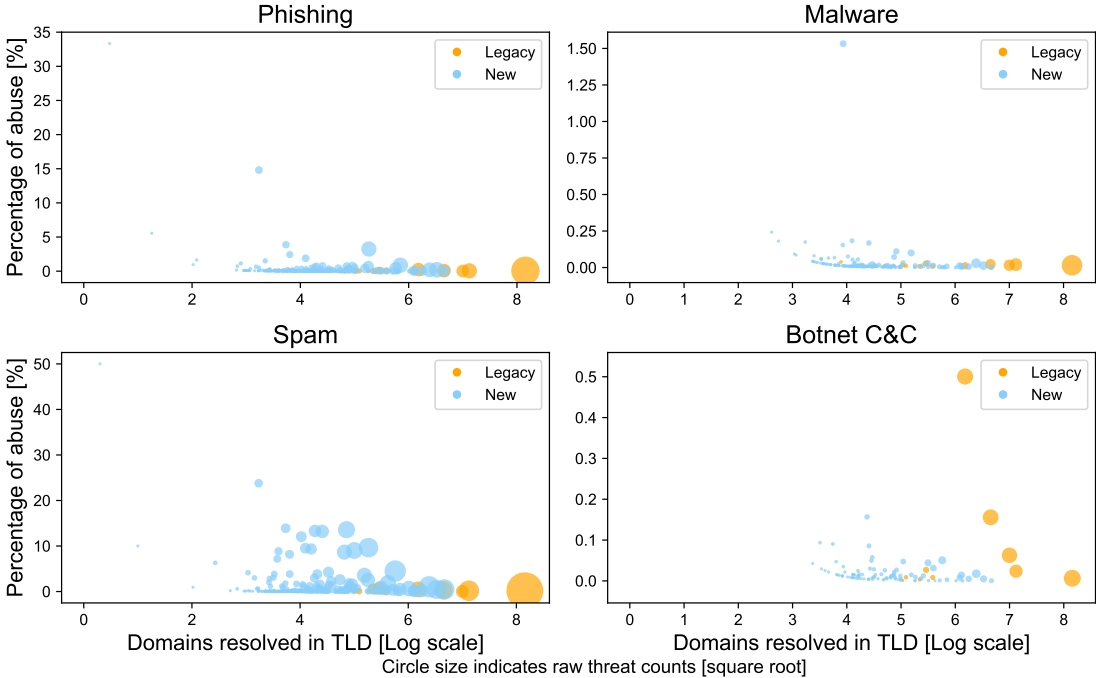


Figure 13: Percentage of abuse for domains identified as security threats vs. counts of resolved domains in gTLDs across different threat types

Finally, Figure 14 shows changes in the average percentage of abuse in legacy and new gTLDs for each security threat of interest to DAAR.

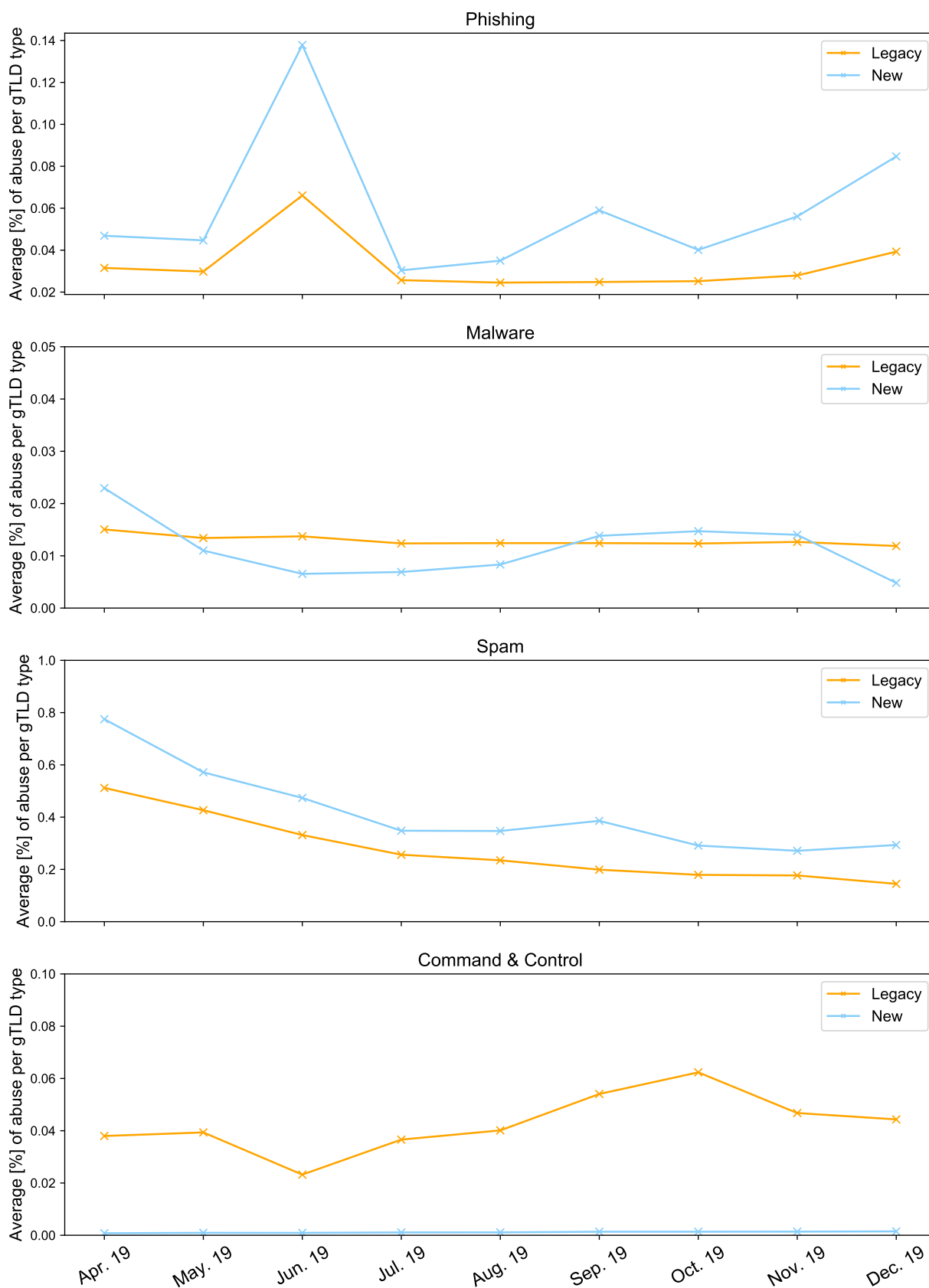


Figure 14: Average percentage of abuse in gTLDs across different threat types over time

References

- [1] *Understanding the Domain Abuse Activity Reporting (DAAR) Monthly Report*. <https://www.icann.org/en/system/files/files/daar-monthly-report-04feb19-en.pdf>. Jan. 2019.
- [2] *ICANN Domain Abuse Activity Reporting*. <https://www.icann.org/octo-ssr/daar>. Dec. 2018.
- [3] *SURBL*. <http://www.surbl.org/lists>. Dec. 2018.
- [4] *Spamhaus*. <https://www.spamhaus.org>. Dec. 2018.
- [5] *Spamhaus Domain Block List (DBL)*. <https://www.spamhaus.org/faq/section/Spamhaus%20DBL#291>. Dec. 2018.
- [6] *Anti-Phishing Working Group (APWG)*. <https://www.apwg.org>. Dec. 2018.
- [7] *PhishTank*. <https://www.phishtank.com>. Dec. 2018.
- [8] *Malware Patrol*. <https://www.malwarepatrol.net/enterprise-threat-data/>. Dec. 2018.
- [9] *Abuse.ch*. <https://abuse.ch>. Dec. 2018.
- [10] *Abuse.ch Feodo Tracker*. <https://feodotracker.abuse.ch>. Dec. 2018.
- [11] *Abuse.ch Ransomware Tracker*. <https://ransomwaretracker.abuse.ch>. Dec. 2018.

Appendix

The table below provides a listing of the reputation providers and feeds used in the DAAR system along with their corresponding threat types.

Reputation provider	Feed used	Threat type
SURBL [3]	JwSpamSpy + Prolocation Sa-blacklist SpamCop AbuseButler Phishing domains Malware domains	Spam Spam Spam Spam Phishing Malware
Spamhaus [4]	Domain Block List (DBL) [5]	Spam - Phishing - Malware - Botnet C&C
Anti-Phishing Working Group [6]	Phishing URLs	Phishing
PhishTank [7]	Phishing URLs	Phishing
Malware Patrol [8]	Malware URLs Ransomware URLs Botnet C&C URLs	Malware Malware Botnet C&C
Abuse.ch [9]	FeodoTracker [10] Ransomware Tracker [11]	Malware Malware