More Mysterious Root Query Traffic From a Large Cloud/DNS Operator

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Discovery

- Analysis of unique names in ICANN Managed Root Serer data taking a long time
- Many weird (random) names
- Second-level label length 12 or 13

Instance	# Queries	# Names	Log Size (bytes)
aa01-fr-bfc	124,411,748	1,860,891	49,409,103
aa01-fr-lio	16,528,533	499,185	12,476,508
aa01-fr-mbv	63,649,855	691,235	16,951,212
aa01-fr-par	318,962,809	19,521,598	543,938,433

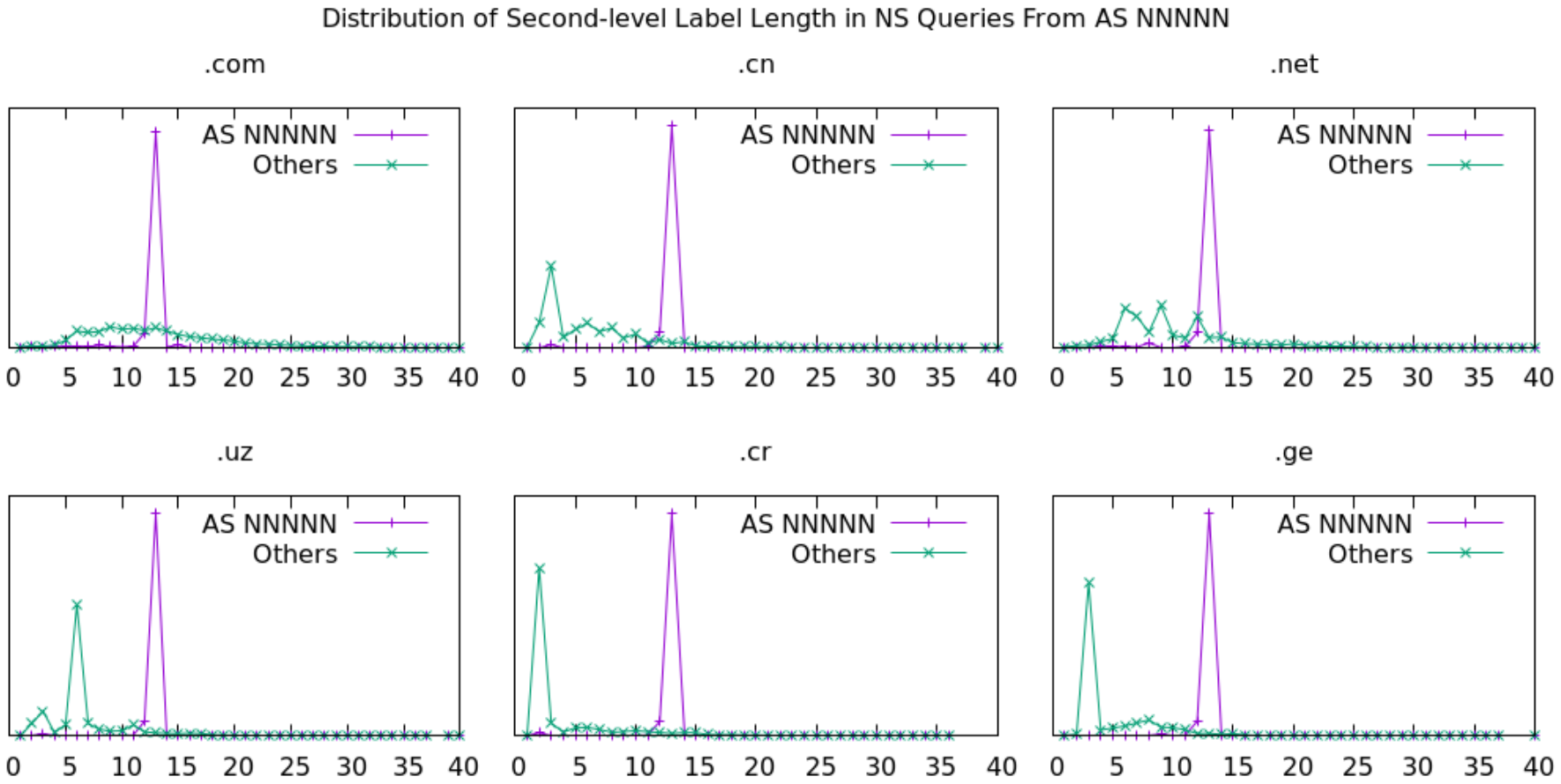
```
F863ZVV1XY2QF.SURGERY
BP639I-3NIRF.HIPHOP
VSQN7JSMF0IVL.LOAN
QO35JJK419GFM.NET
YYIF0AIJR21GN.COM
YIJOBSSQ-F0N.DE
BC9R7RSB9X0OH.HOUSE
TA2KN2ISP45QO.COM
XVSFZKPKVM4ID.COM
ZMF2QIG0ANJMM.CU
QYYX31MPJ0Z9H.SANOFI
DQ0G3MVB9NR-F.IT
U5VMT7XANB6RF.COM
B4E6RSNQ37KJK.LAW
```

From 24 hours of IMRS data on June 15, 2021, provided by ICANN.

The Signal

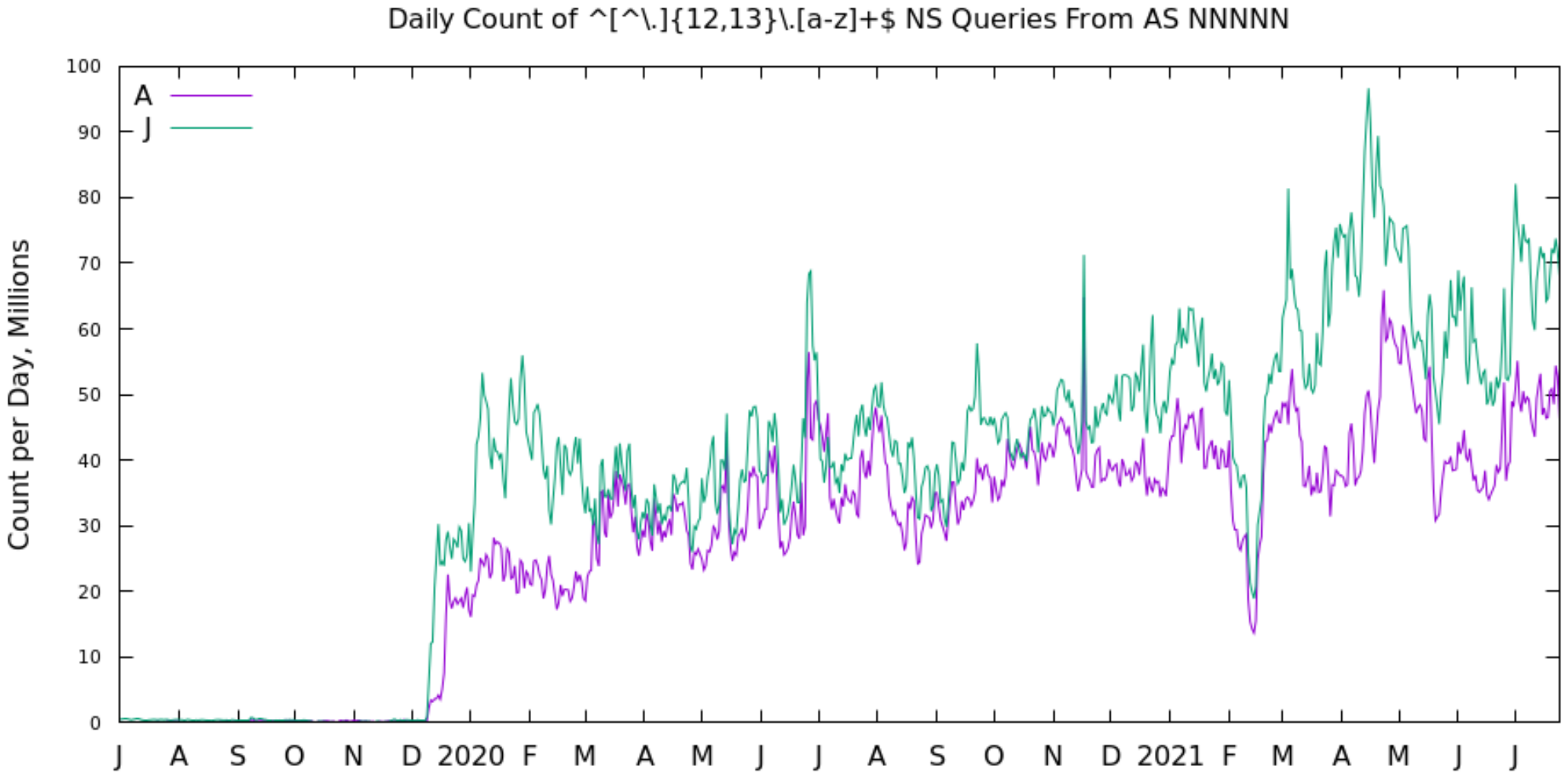
- Query type: NS
- Second-level label length: 12 or 13 characters

Confirmed in A-Root and J-Root Traffic



Data from July 6, 2021

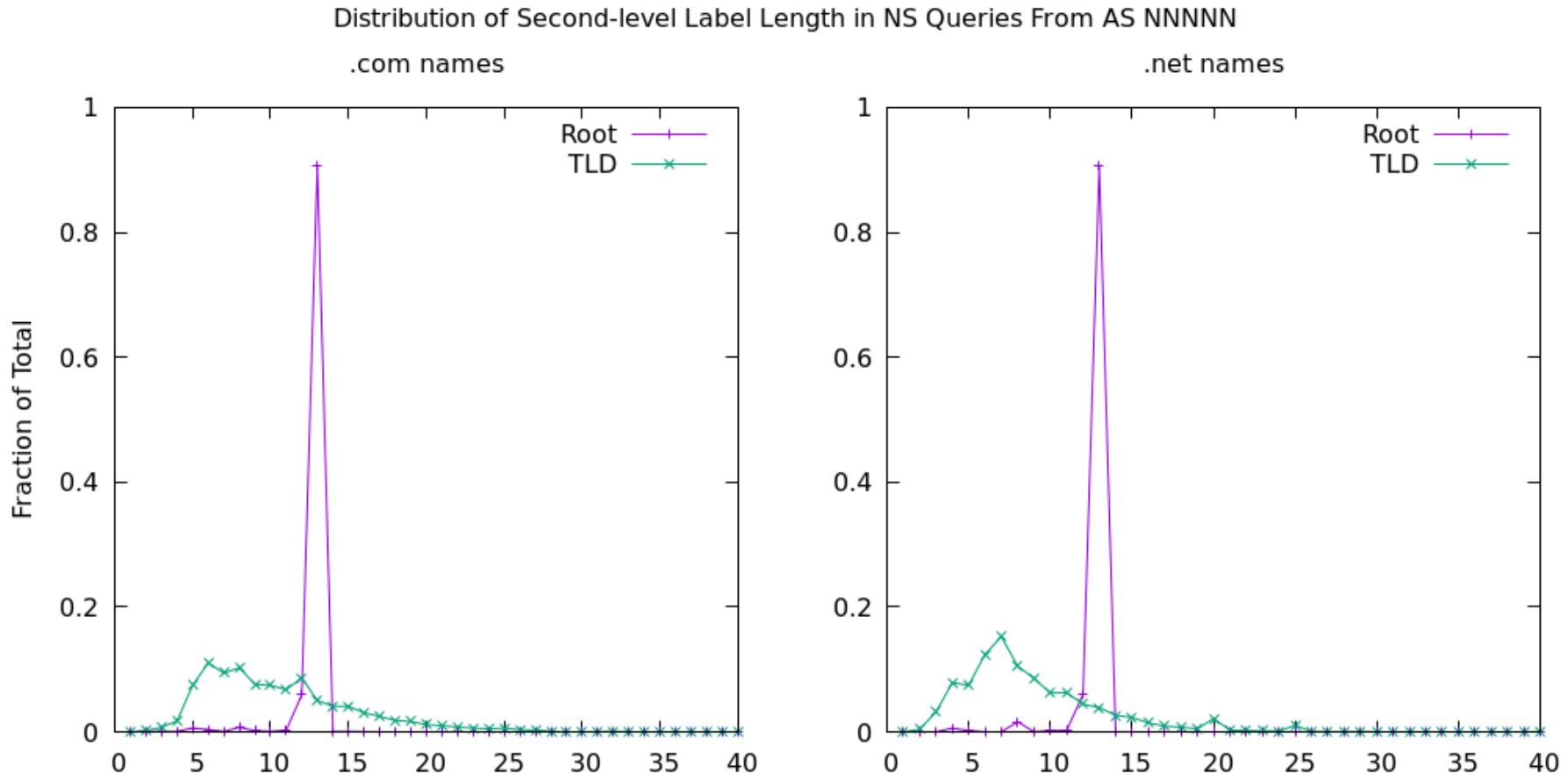
Further Research: Occurring Since Late 2019



DNS Resolver or Cloud Customer Traffic?

- For A-root & J-root, 99.9% of query sources fall within IPv4 and IPv6 prefixes listed as backend query sources for the DNS resolver service
- So, probably coming from the recursive DNS, and not other cloud customers

Why Observed at Root, but Not TLD?



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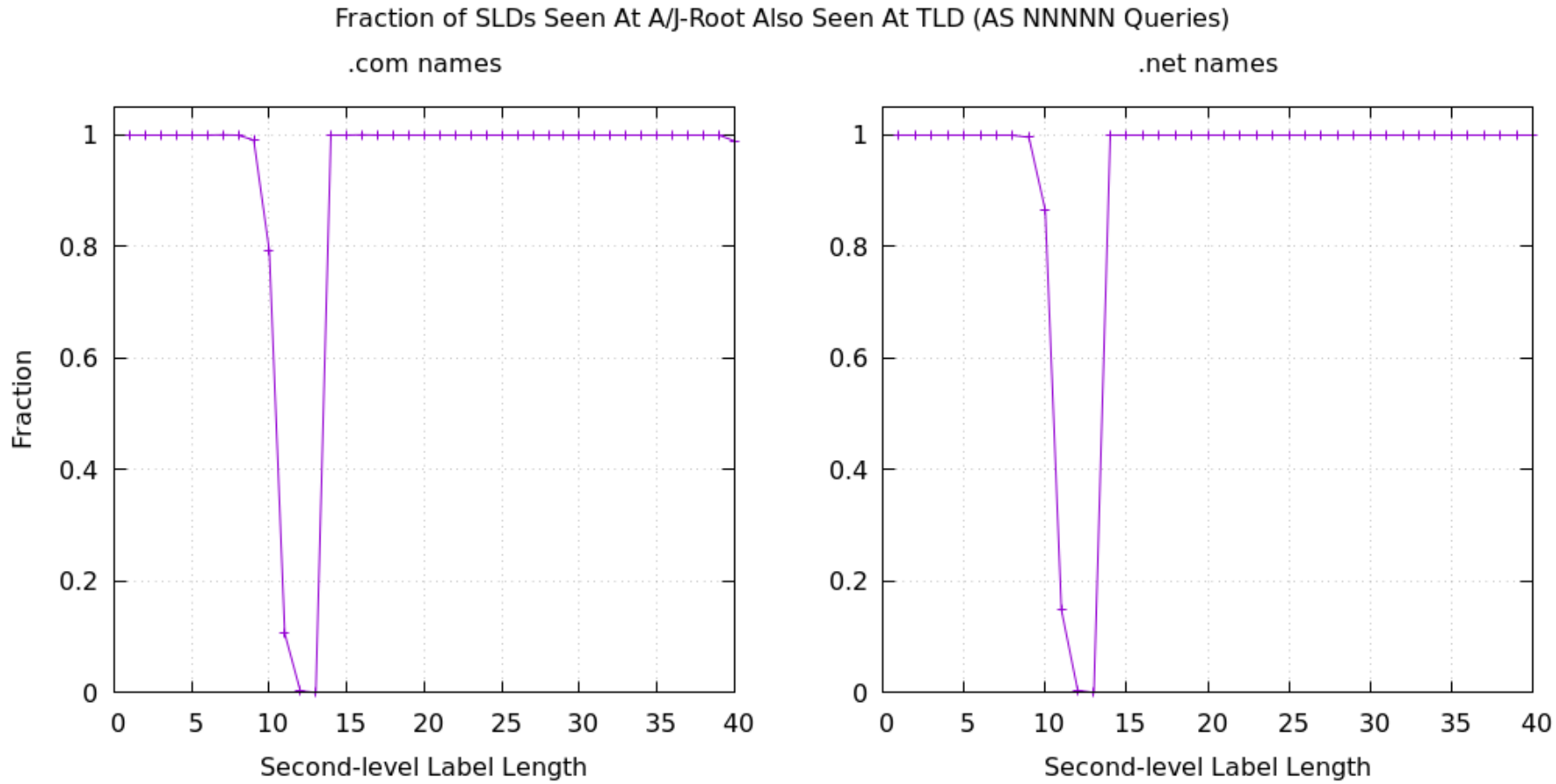

Data from August 16, 2021

Could Be An Embedded Dot in the Label?

- Verified that qnames consist of separate labels
- Root server returns delegation referral and not RCODE 3 (NXDomain)

In Summary

- Excessive amount of unusual queries observed at root name servers
- Type NS
- Second-level label 12-13 random characters, across multiple TLDs
- From the autonomous system of a large DNS/cloud provider
- IPv4 and IPv6
- Since late 2019
- Source IP analysis implies queries come from recursive resolver
- But no observed follow-up queries at the TLD name servers

Answers?