

Slack's DNSSEC Rollout

Third Time's the Outage





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What's DNSSEC?









Domain Name System Security Extensions (DNSSEC).

Is a suite of extensions intended for securing data exchanged by the DNS protocol.

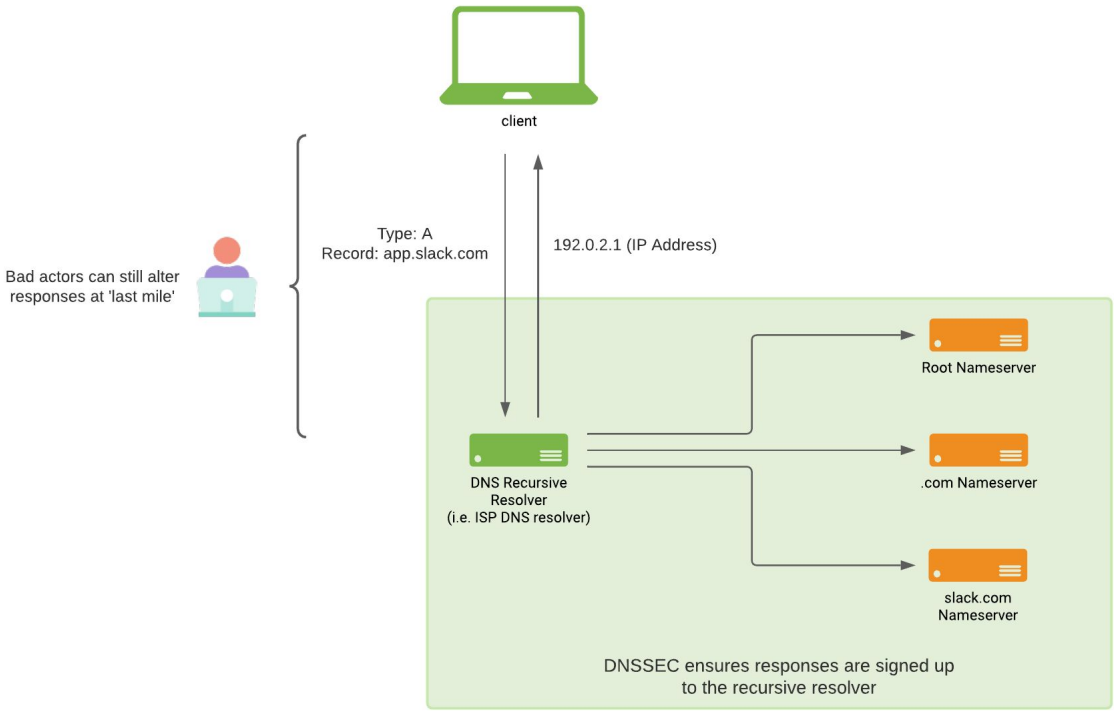


DNSSEC Record and Key Types

-  DS
-  DNSKEY
-  RRSIG
-  NSEC/NSEC3
-  ZSK
-  KSK



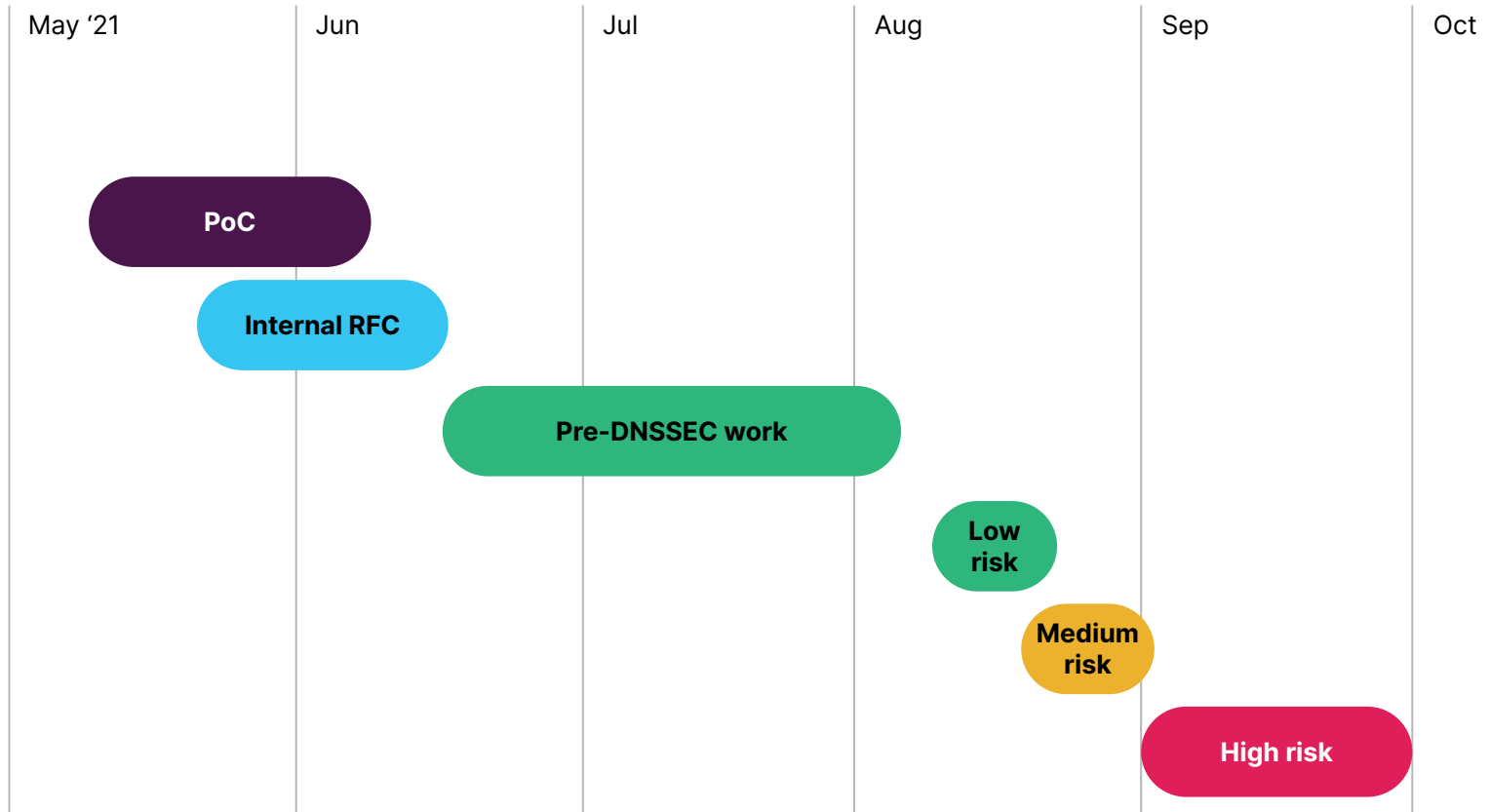
DNS record request (DNSSEC enabled)



The DNSSEC Journey at Slack



DNSSEC Journey at Slack



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Attempt #1

Regional ISP Issue



Attempt #2

CNAME at the apex



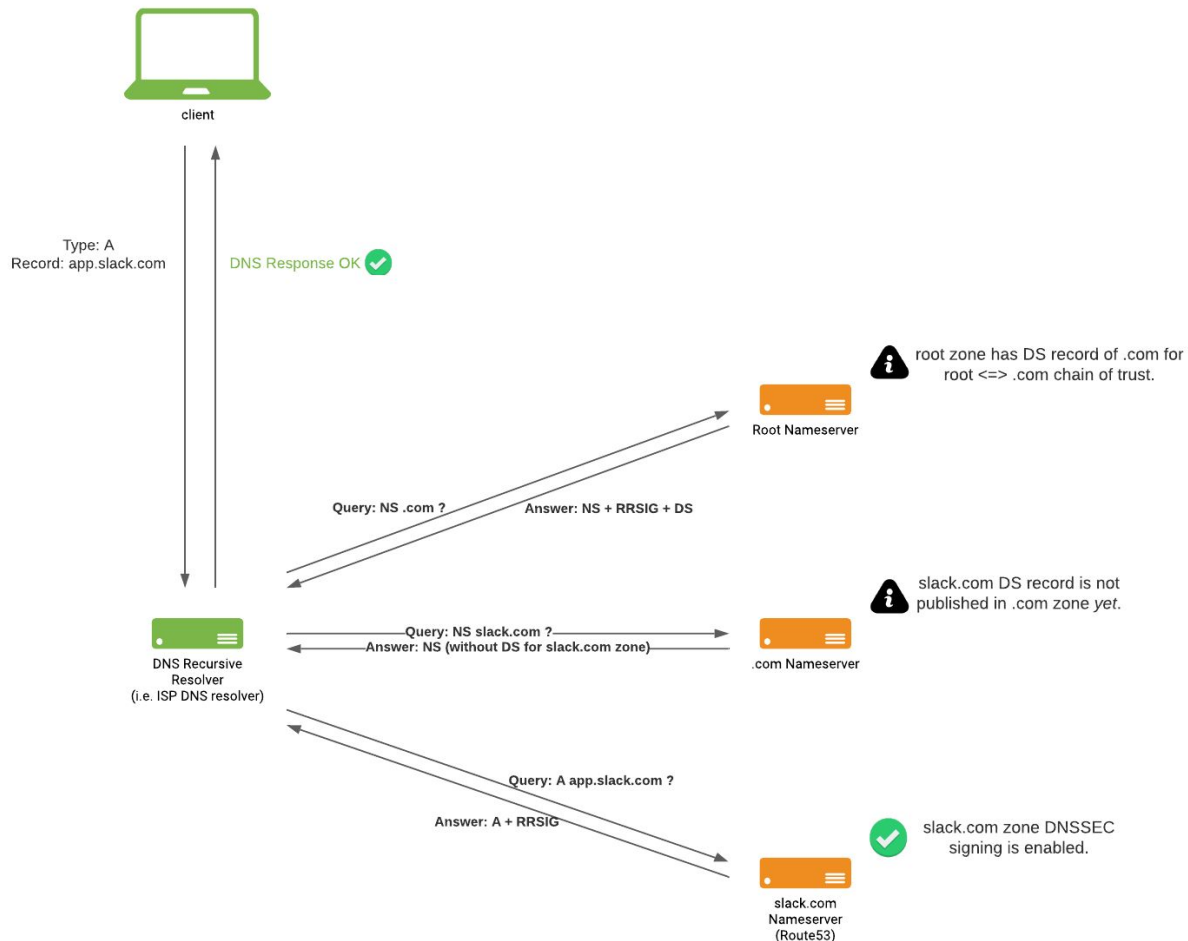
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Attempt #3

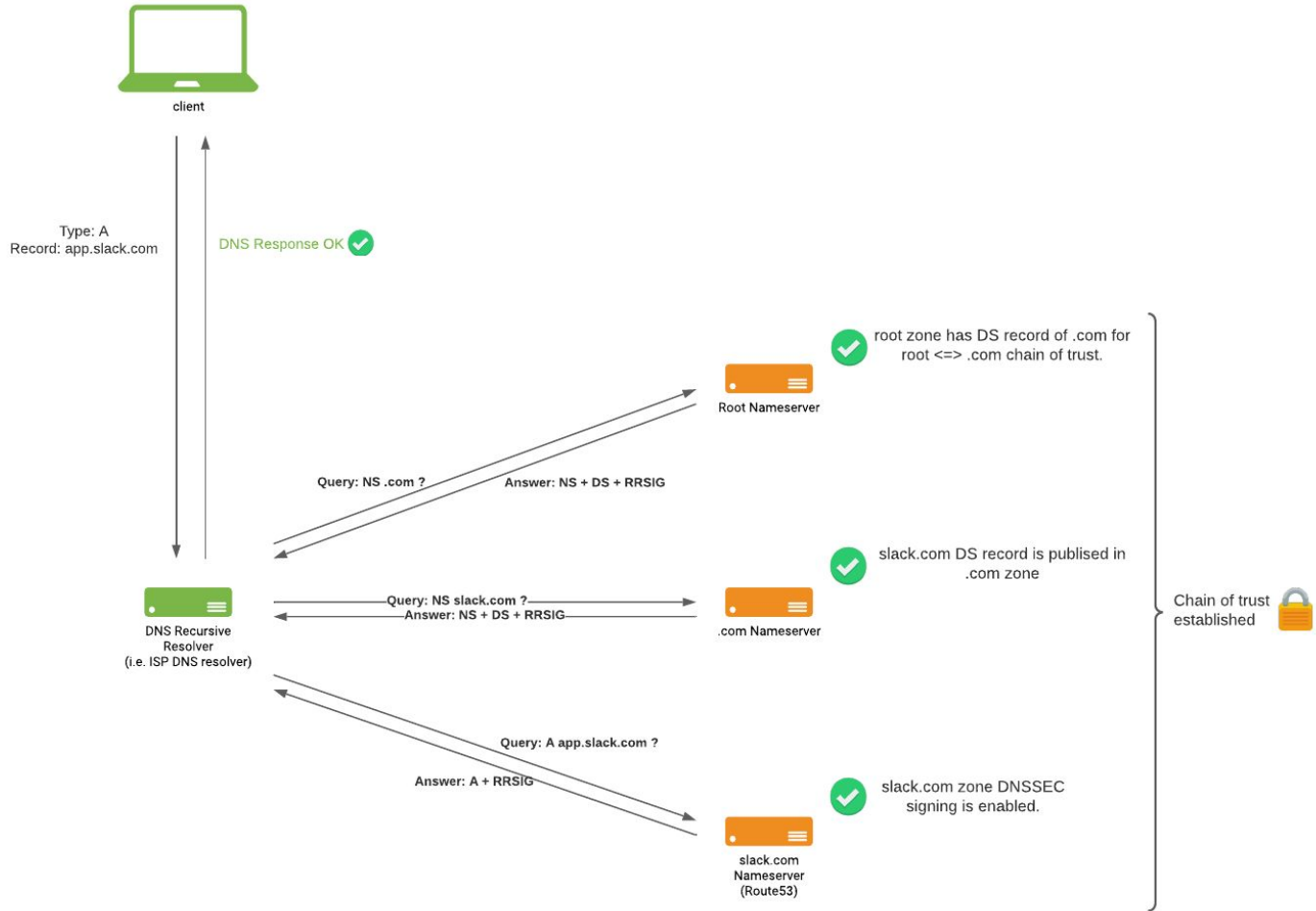
The perfect storm



Third time's the outage



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Success!



ThousandEyes APP

[Alert cleared for slack.com DNSSEC lookup](#)

Alert ID: 91958601

Test Name: [slack.com](#) DNSSEC lookup

Domain: [slack.com](#) A

Alert Rule: Default DNSSEC Alert Rule - Error is present

No. of Agents: 8

ThousandEyes Alerts | Sep 30th

[Alert cleared for wss-primary.slack.com DNSSEC lookup](#)

Alert ID: 91958600

Test Name: [wss-primary.slack.com](#) DNSSEC lookup

Domain: [wss-primary.slack.com](#) A

Alert Rule: Default DNSSEC Alert Rule - Error is present

No. of Agents: 8

ThousandEyes Alerts | Sep 30th

[Alert cleared for wss-backup.slack.com DNSSEC lookup](#)

Alert ID: 91958603

Test Name: [wss-backup.slack.com](#) DNSSEC lookup

Domain: [wss-backup.slack.com](#) A

Alert Rule: Default DNSSEC Alert Rule - Error is present

No. of Agents: 8

ThousandEyes Alerts | Sep 30th



First reports came in



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net.log

Import
Proxy
Events
Timeline
DNS
Sockets
Alt-Svc
HTTP/2
QUIC
Reporting
Cache

- [View pending lookups](#)

Async DNS Configuration

- Internal DNS client enabled: true

nameservers	8.8.8.8:53 8.8.4.4:53
allow_dns_over_https_upgrade	false
append_to_multi_label_name	true
attempts	2
disabled_upgrade_providers	
dns_over_tls_active	false
dns_over_tls_hostname	
doh_attempts	1
doh_servers	
ndots	1
num_hosts	3
rotate	false
search	
secure_dns_mode	0
timeout	1
unhandled_options	false
use_local_ipv6	false

ID	Source Type
4	COOKIE_STORE
6	URL_REQUEST
7	URL_REQUEST
8	DISK_CACHE_ENTRY
9	DISK_CACHE_ENTRY
10	HTTP_STREAM_JOB_CONTROLLED
11	NONE
12	HTTP_STREAM_JOB
13	SSL_CONNECT_JOB
14	HOST_RESOLVER_IMPL_JOB
15	HTTP_STREAM_JOB_CONTROLLED
16	HTTP_STREAM_JOB
17	SSL_CONNECT_JOB
<input checked="" type="checkbox"/>	18 HOST_RESOLVER_IMPL_JOB
19	SOCKET
20	CERT_VERIFIER_JOB
21	URL_REQUEST
22	DISK_CACHE_ENTRY

18: HOST_RESOLVER_IMPL_JOB
app.slack.com
Start Time: 2021-09-30 12:32:59.121

```
t=6 [st=0] +HOST_RESOLVER_IMPL_JOB [dt=1]
--> host = "app.slack.com"
--> source_dependency = 17 (SSL_CONNECT_JOB)
t=6 [st=0]   HOST_RESOLVER_IMPL_JOB_REQUEST_ATTACH
--> priority = "HIGHEST"
--> source_dependency = 17 (SSL_CONNECT_JOB)
t=6 [st=0]   HOST_RESOLVER_IMPL_JOB_STARTED
t=6 [st=0] +HOST_RESOLVER_IMPL_PROC_TASK [dt=1]
t=6 [st=0]   HOST_RESOLVER_IMPL_ATTEMPT_STARTED
--> attempt_number = 1
t=7 [st=1] -HOST_RESOLVER_IMPL_PROC_TASK
--> net_error = -105 (ERR_NAME_NOT_RESOLVED)
--> os_error = 8
--> os_error_string = "nodename nor servname provided, or not known"
t=7 [st=1]   HOST_RESOLVER_IMPL_ATTEMPT_FINISHED
--> attempt_number = 1
--> net_error = -105 (ERR_NAME_NOT_RESOLVED)
--> os_error = 8
--> os_error_string = "nodename nor servname provided, or not known"
t=7 [st=1] -HOST_RESOLVER_IMPL_JOB
--> net_error = -105 (ERR_NAME_NOT_RESOLVED)
```

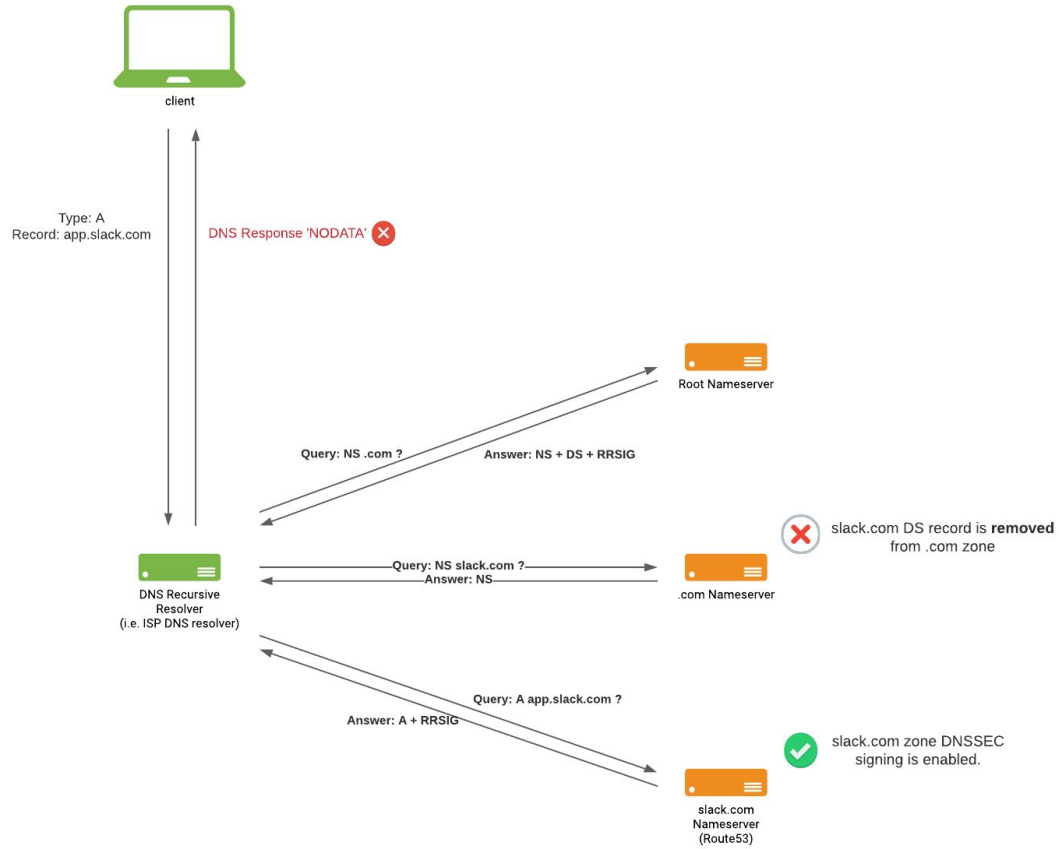


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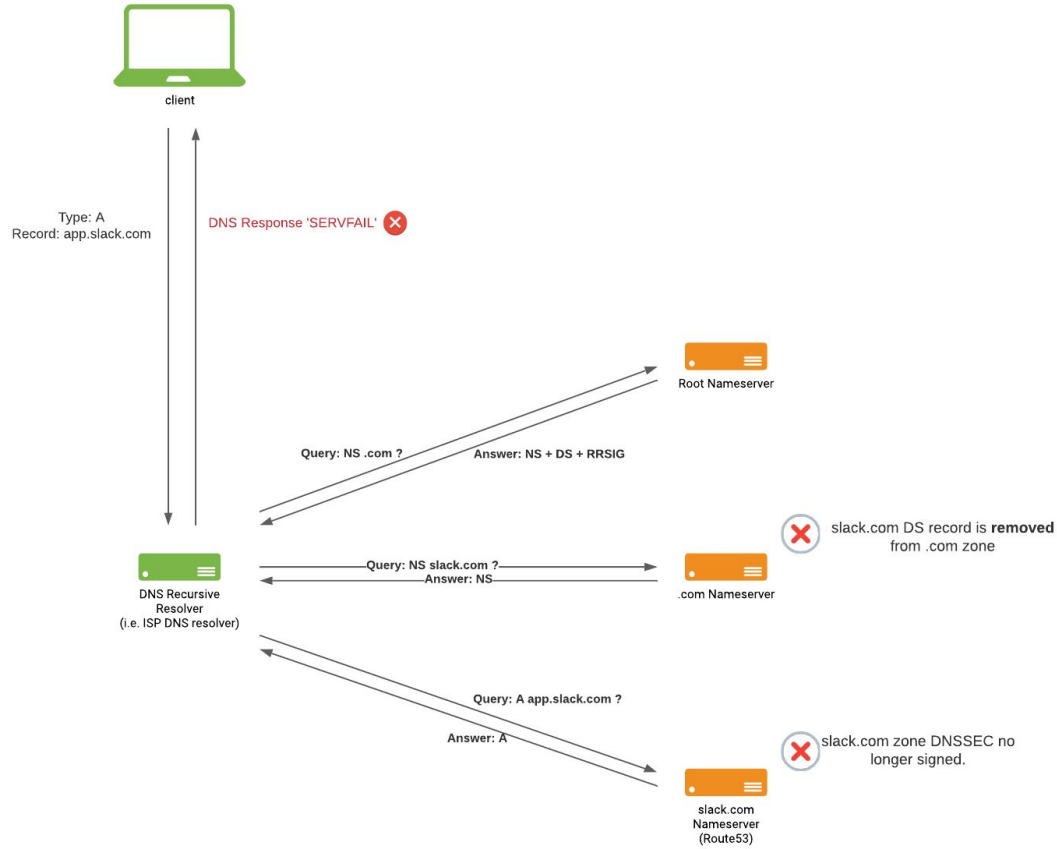
Rollback 



Third time's the outage



Third time's the outage



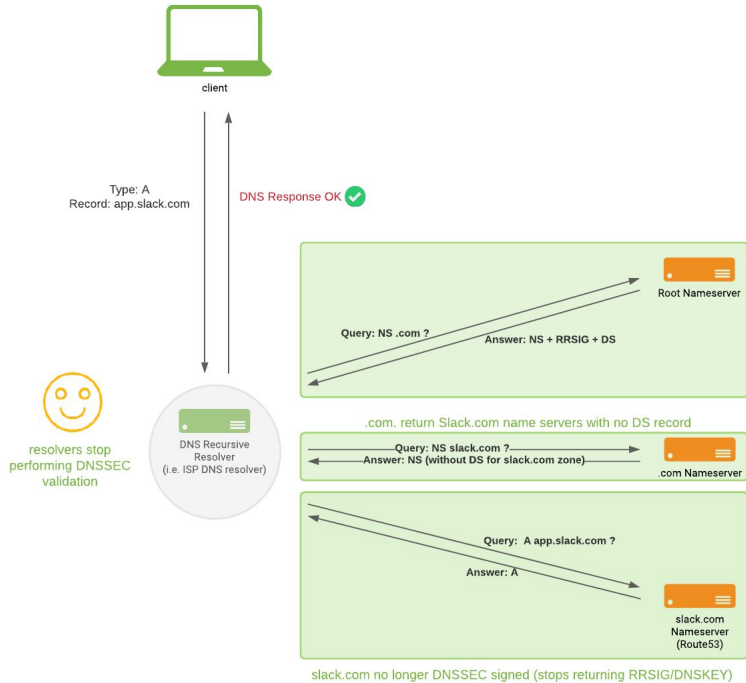
Third time's the outage

<input type="checkbox"/>	Status	Severity	Summary	Created	Service	
<input type="checkbox"/>	Resolved	Warning	Default DNS Server Alert Rule for slack.com dns lookup - Quad9 	on Sep 30, 2021 at	Ingress loadbalancing	
CUSTOM DETAILS						
Agents	Boston, MA, Barcelona, Spain, us-east-1e, ap-southeast-1a, Perth, Australia, sa-east-1c					
Alert ID	91886994					
Alert Rule	Default DNS Server Alert Rule - Error is present					
Link	https://app.thousandeyes.com/view/tests/?__a=34069&scenarioId=dnsServer&roundId=1633022400&testId=1764971&serverId=345371					
No. of Agents	6					
Rule ID	1275693					
Server	9.9.9.9:53					
Start Date	2021-09-30 UTC					
Test ID	1764971					
Test Name	slack.com dns lookup - Quad9					
Type	DNS Server					
View Message						

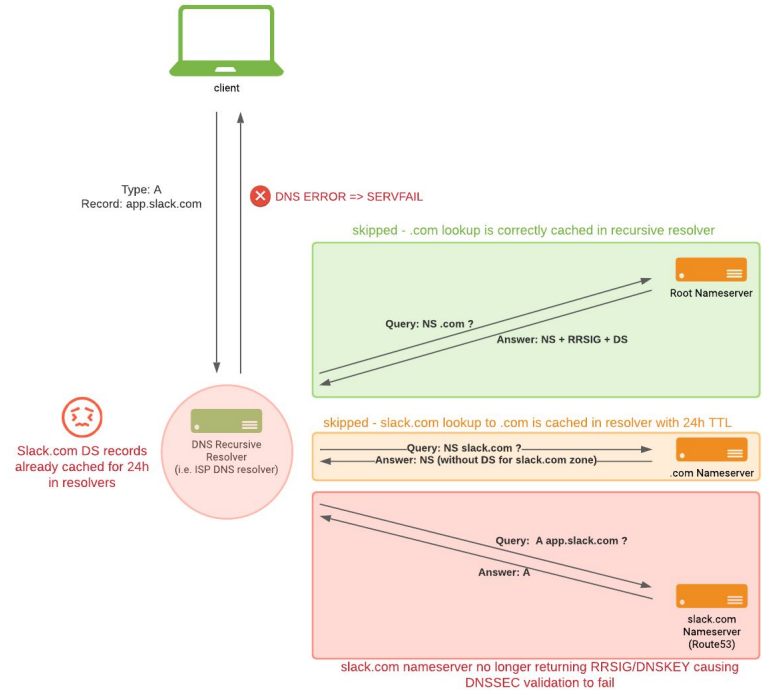


Third time's the outage

Expected behaviour



Actual behaviour



CONTACT



Third time's the outage

Restore the keys



Third time's the outage

TTLs expired 🙌



Chasing the root cause



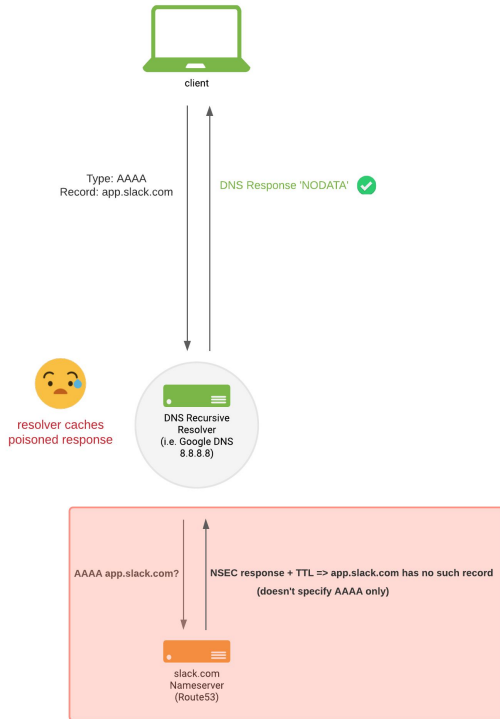
Looking for evidence



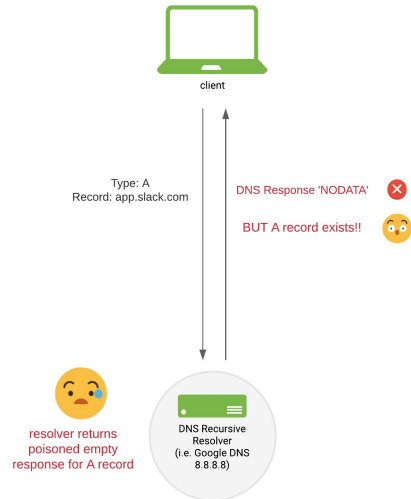
Working with the



Lookup #1



Lookup #2



Mystery solved 🧘



Attempt #4

Fourth time's the charm





Rafael (Rafa) Elvira ● 15:18

we are good to go for Saturday 🙌

- Revisit DNSSEC runbook with learnings + feedback
- Amazon Route 53 team to confirm ZSK restore fully rolled out
- Test and document ZSK restore in test zone
- Enable Route53 logs on [slack.com](#) zone
- Create dashboard to monitor during the rollout (based on logs and other key metrics)
- Lower zone maximum TTL, SOA TTL and SOA minimum TTL of [slack.com](#) zone
- Enable signing on [slack.com](#) delegated zones to NS1
- Enable signing on [slack.com](#) authoritative zone in Route53
- Create necessary DS records in [slack.com](#) authoritative zone to establish chain of trust with delegated zones
- Run validation tests from DNSSEC runbook
- Share rollout date+time and plan with Customer Experience and Engineering org.
- Share rollout date+time and plan with Salesforce Public DNS team.
- Share rollout date and time with DNS-OARC
- Share rollout date and time with NANOG
- Enable ThousandEyes DNSSEC monitors for [slack.com](#) (Done Saturday at time of rollout)
- Publish DS record at the .com zone (Done Saturday at time of rollout)



slack.com DNSSEC 



Acknowledgements / Q&A



BIG thank you to everyone!

Amazon Route53 Team, Salesforce
Public DNS team, DNS-OARC
community and our incredible
Customer Experience team!



Q&A time!

Detailed blog post: <https://bit.ly/3HMh46y>

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Thanks!

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