Vertex

Synapse Bootcamp - Module 9

Pivoting and Traversal in Storm - Exercises

Objectives

In these exercises you will learn:

- How to perform common pivot operations using Storm
- How to perform common traversal operations using Storm
- How the ability to examine large data sets differs when using UI navigation vs. Storm

Note: We are constantly updating Synapse and its Power-Ups! We do our best to make sure our course documents (slides, exercises, and answer keys) are up-to-date. However, you may notice small differences (such as between a screen capture in the documents and the appearance of your current instance of Synapse).

If something is unclear or if you identify an error, please reach out to us so we can assist!

Exercises

- All exercises use the **Research Tool** with the **Storm Mode Selector** set to **Storm mode.**
- Some example queries may wrap due to length.

The **Storm Quick Reference** on Pivots and Traversals (included with the supplemental materials provided for this course) may be helpful for this (and future) exercises.

The online **pivot and traversal** reference includes detailed documentation and examples for all pivot and traversal operations. It is part of the Storm Reference included with the Synapse User Guide.

Pivoting

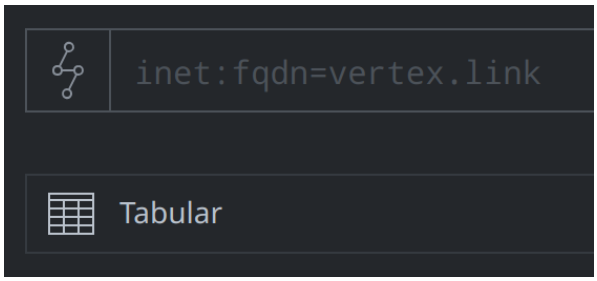
Exercise 1

Objectives:
- **Write and execute basic Storm queries using pivot operations.**
- **Use the special "pivot to tags" operation.**
- **Leverage the 'uniq' Storm command to deduplicate results.**

Note: You can use either **explicit** or **implicit** pivot syntax for the following exercise.

You are researching a suspicious IPv4 address and want to know what FQDNs have resolved to that IP.

- In the **Research Tool,** ensure your **Storm Query Bar** is in **Storm mode** and your display mode is set to **Tabular:**



- Enter the following in the **Storm Query Bar** and press **Enter** to run the query:

```
inet:ipv4=173.254.222.138
```

Question 1: How can you **add** to the Storm query in order to **pivot** to the associated DNS A (**`inet:dns:a`**) records? How many DNS A records are returned?

Question 2: How can you **add** to your Storm query to **pivot** from the DNS A records to the associated FQDNs (**`inet:fqdn`** nodes)? How many FQDNs are returned?

Question 3: How can you **add** to your Storm query to **pivot to tags** and view the **`syn:tag`** nodes for the tags on the FQDNs?

Question 4: How many **`syn:tag`** nodes are returned? Why are there duplicates?

Question 5: What Storm command can you **add** to your Storm query to **deduplicate** ("unique") your results and only display one instance of each tag?

Exercise 2

Objectives:
- **Write and execute basic Storm queries using pivot operations.**
- **Compare and contrast use of the Synapse UI and use of Storm to examine data.**

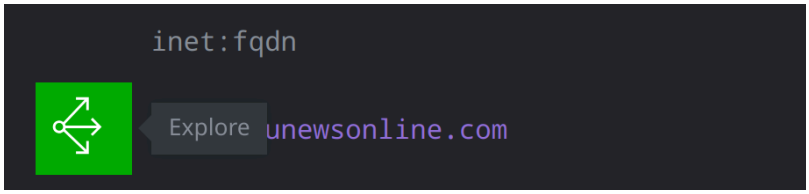
You are researching malicious FQDNs and want to identify any files (malware samples) that communicate with those FQDNs.

- Enter the following in the **Storm Query Bar** and press **Enter** to run the query:

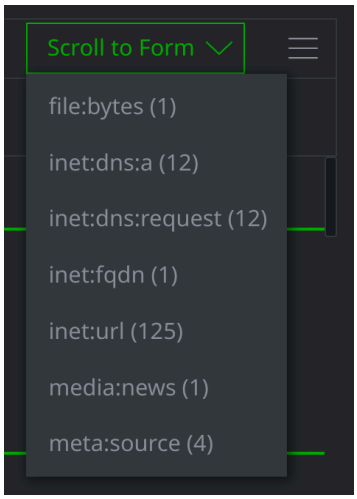
```
inet:fqdn=media.aunewsonline.com
```

First, we'll use the **Explore** button to answer this question.

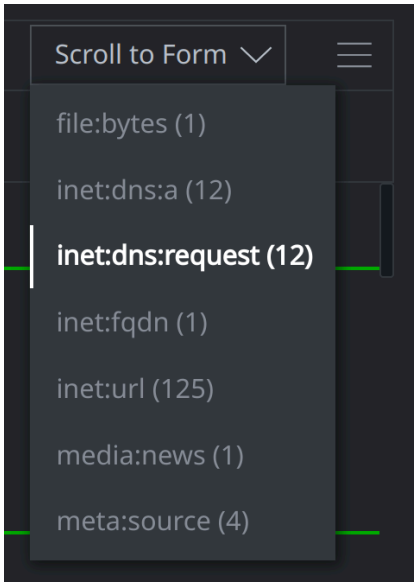
- Click the **Explore** button next to the FQDN to display adjacent nodes:



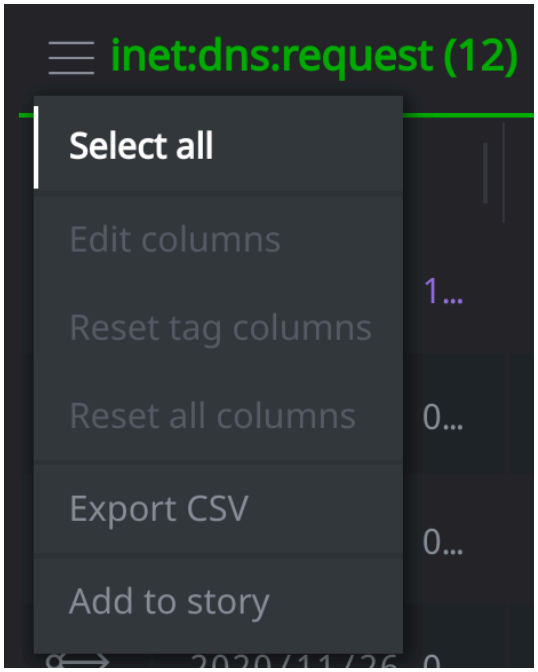
- Click the **Scroll to Form** button. **Note** the number and kinds of forms in the dropdown list:



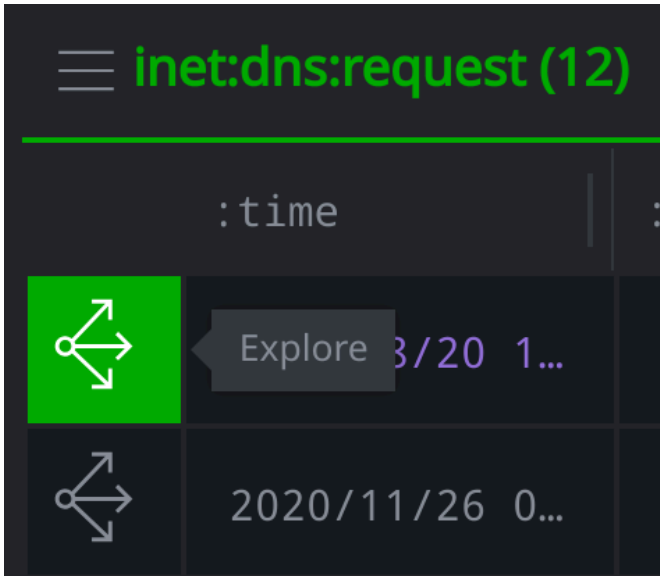
- Choose **`inet:dns:request`** from the dropdown list:



- Click the **hamburger menu** next to the **inet:dns:request** table header and choose **Select All:**



- Click the **Explore** button next to any of the **`inet:dns:request`** nodes to display adjacent nodes:



Question 1: How many files perform DNS queries for the FQDN **`media.aunewsonline.com`**?

It was easy to answer the question with the UI! But you had to navigate (Explore) through a lot of nodes that were not related to your question.

Using Storm to **pivot** directly to the data you need can be more efficient when you are asking a specific question. Let's answer the same question using Storm.

Note: You can use either **explicit** or **implicit** pivot syntax for the following exercise.

- Click **query** in your **breadcrumbs** to return to your original query:


```
inet:fqdn=media.aunewsonline.com
```

Question 2: How can you **add** to your Storm query to **pivot** to the associated DNS requests (**`inet:dns:request`** nodes)?

Question 3: How can you **add** to your Storm query to **pivot** from the DNS requests to the files (**`file:bytes`**) that make the requests?

Question 4: Do you have duplicate results? If so, how can you **add** to your query to remove deduplicate ("unique") the results?

Edge Traversal

Exercise 3

Objective:
- **Write and execute basic Storm queries using edge traversal operations.**

You are researching a malicious FQDN. You want to know if it has appeared in any articles (**`media:news`** nodes) that might provide more context.

- Enter the following into your **Storm Query Bar** and press **Enter** to run the query:

```
inet:fqdn=chemscalere.com
```

Question 1: How can you **add** to your query to **traverse any light edges** and find **any** nodes that "point to" the FQDN?

> **Hint:** Recall that all lightweight edges have a **direction.** If we want things that "point to" the FQDN, the traversal "arrow" should face to the **left.**

Question 2: What kinds of nodes are linked to the FQDN using light edges?

We want to see articles (`media:news` nodes) that include our FQDN. Our results include other nodes that we are not interested in.

Question 3: How can you **modify** your Storm query to return **only** articles (`media:news` nodes) that include the FQDN?

Using Synapse with Large Data Sets

Exercise 4

Objectives:

- **Write and execute basic Storm queries using pivot operations for large data sets.**
- **Compare and contrast using the Synapse UI and using Storm to examine data.**

In **Exercise 2**, we used both the Synapse UI and Storm to find the files that query the malicious FQDN **`media.aunewsonline.com`**.

In that example, there was not much difference between the two methods.

However, there are times when using **Explore** is less efficient than using Storm. Sometimes this difference is significant! This is especially true when performing queries using **large data sets.**

In Exercise 2 we started with one FQDN (**`media.aunewsonline.com`**) and found malware that queries that FQDN.

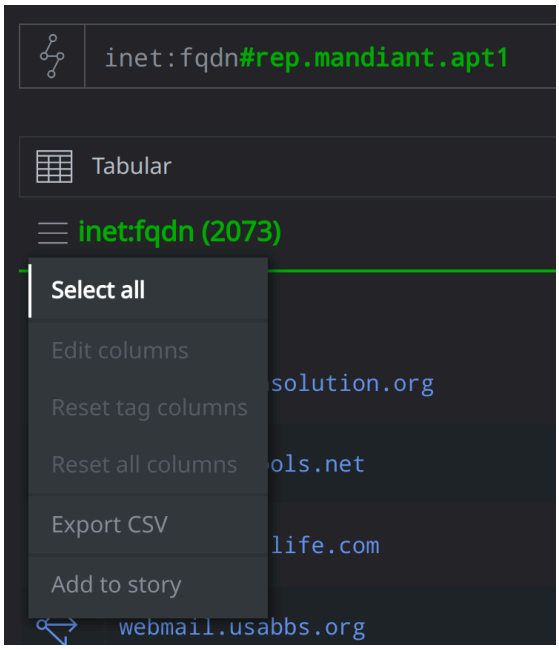
What if, instead of asking about **one** FQDN, we want to find malware that queries **any** APT1 FQDN? (There are just over 2,000 FQDNs.)

First let's try to answer the question using the **Explore** button.

- Enter the following in the **Storm Query Bar** and press **Enter** to run the query to lift **all** of the APT1 FQDNs:

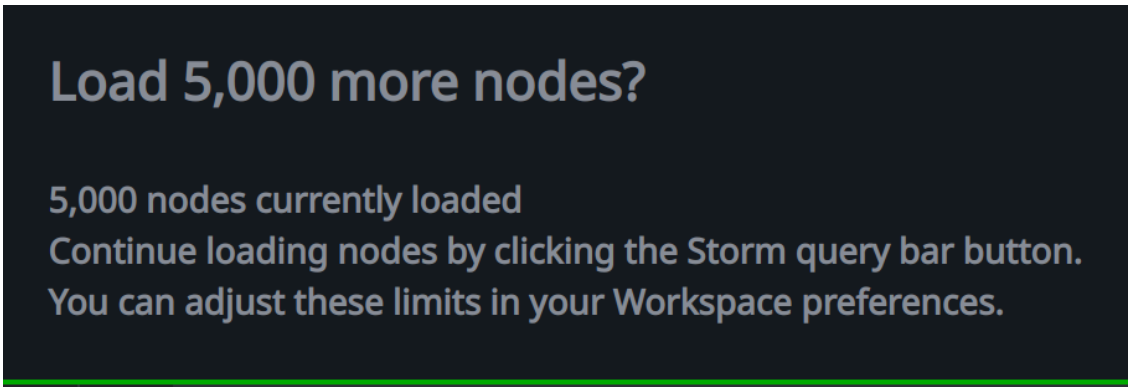
```
inet:fqdn#rep.mandiant.apt1
```

- Click the **hamburger menu** to the left of the **inet:fqdn** table header and choose **Select All** to select all 2,073 results:



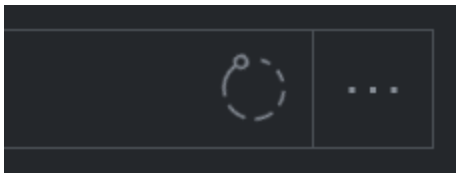
- Click the **Explore** button next to any of the **`inet:fqdn`** nodes to display adjacent nodes:

Note: Synapse will prompt you to continue loading results:



You can:

- choose **not** to continue loading, or
- **cancel** a running query at any time by clicking the spinning **Query Status Icon** to the right of the **Storm Query Bar:**



Question 1: What happens? Are you able to use the **Explore** button, or do you get stuck? (That is, do you get tired of loading results and wondering when Synapse will finish?)

Now we'll answer the question using a **Storm query.**

- Enter the following into your **Storm Query Bar** and press **Enter** to run the query:

```
inet:fqdn#rep.mandiant.apt1 -> inet:dns:request -> file:bytes
  | uniq
```

Question 2: What happens? How many files are returned?
