Synapse Bootcamp - Module 10

Filtering in Storm - Answer Key

Answer Key

Simple Filters

Exercise 1 Answer

Objective:

- **Use Storm to perform simple filter operations.**

Part 1

Question 1: How can you **add a filter** to your existing query to **only** display the **`inet:url`** nodes?

- You can filter the nodes with the following Storm:

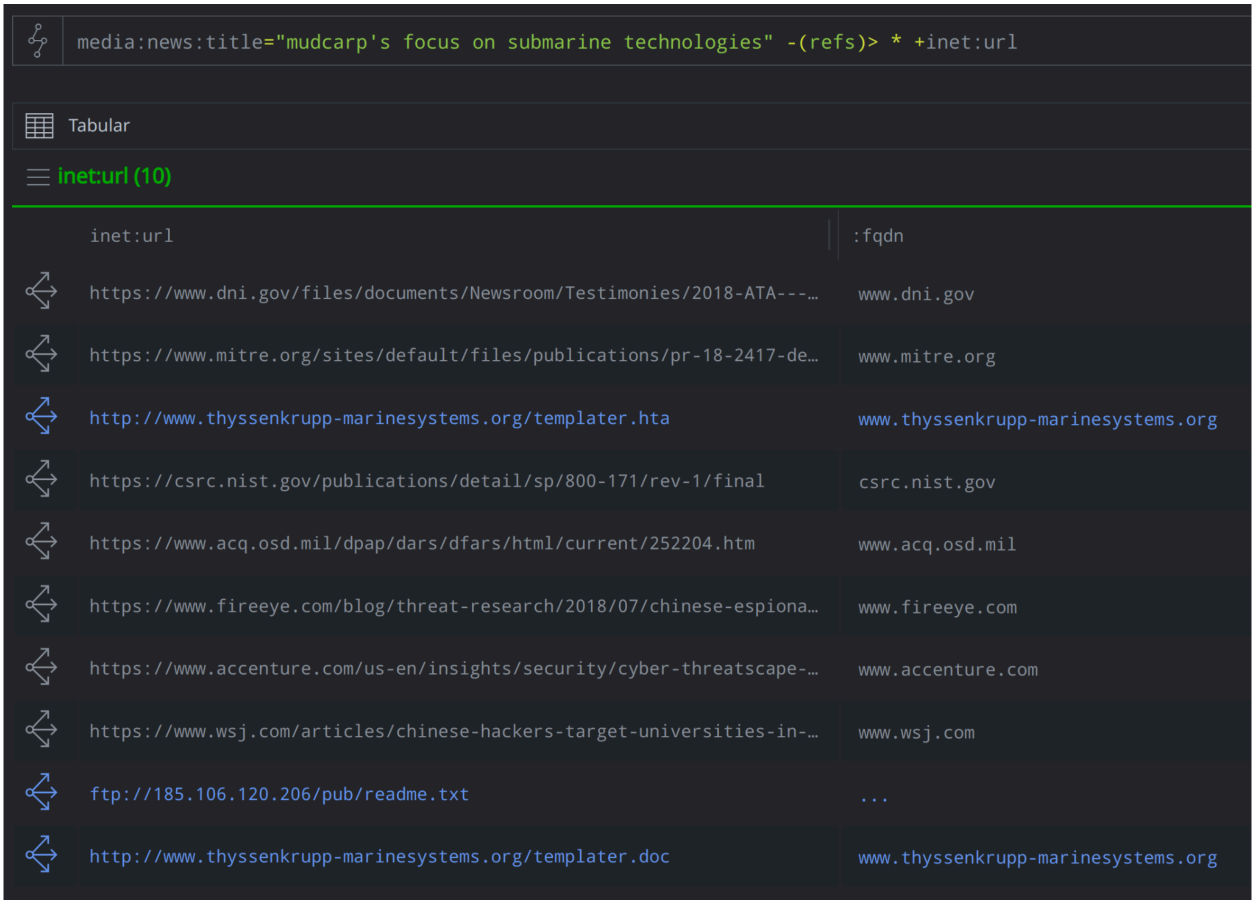
```
media:news:title="mudcarp's focus on submarine technologies"
  -(refs)> * +inet:url
```

You're telling Synapse to limit (downselect) your results to **only include** `inet:url` nodes.

(This is called a **filter by form**).

Technically, you can **modify** your original query to only traverse the **`refs`** edge to any **`inet:url`** nodes in the first place (which is actually a bit more efficient). But we want to practice with filters!

- Running this query will produce the following:



```
media:news:title="mudcarp's focus on submarine technologies" -(refs)> * +inet:url
```

Tabular

inet:url (10)

inet:url	:fqdn
https://www.dni.gov/files/documents/Newsroom/Testimonies/2018-ATA---…	www.dni.gov
https://www.mitre.org/sites/default/files/publications/pr-18-2417-de…	www.mitre.org
http://www.thyssenkrupp-marinesystems.org/templater.hta	www.thyssenkrupp-marinesystems.org
https://csrc.nist.gov/publications/detail/sp/800-171/rev-1/final	csrc.nist.gov
https://www.acq.osd.mil/dpap/dars/dfars/html/current/252204.htm	www.acq.osd.mil
https://www.fireeye.com/blog/threat-research/2018/07/chinese-espiona…	www.fireeye.com
https://www.accenture.com/us-en/insights/security/cyber-threatscape-…	www.accenture.com
https://www.wsj.com/articles/chinese-hackers-target-universities-in-…	www.wsj.com
ftp://185.106.120.206/pub/readme.txt	...
http://www.thyssenkrupp-marinesystems.org/templater.doc	www.thyssenkrupp-marinesystems.org

Question 2: How can you **add a filter** to your query to **only** display URLs that Accenture reported?

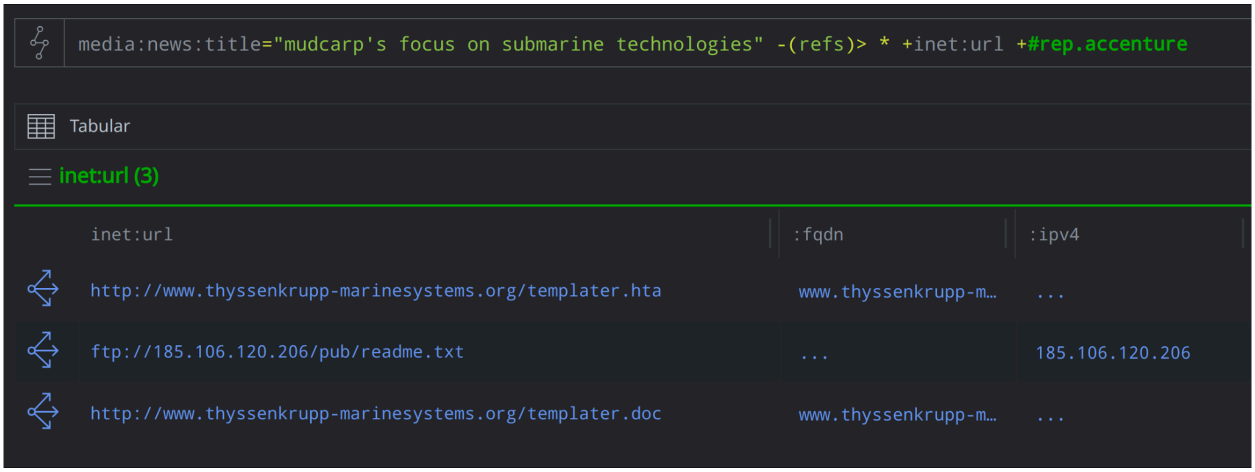
- You can filter the nodes with the following Storm:

```
media:news:title="mudcarp's focus on submarine technologies"
  -(refs)> * +inet:url +#rep.accenture
```

You're telling Synapse to limit (downselect) your results to only **include** nodes reported by Accenture (e.g., as associated with the MUDCARP threat group or a malware family).

(This is called a **filter by tag**).

- Running this query will give you the following results:



```
media:news:title="mudcarp's focus on submarine technologies" -(refs)> * +inet:url +#rep.accenture
```

inet:url	:fqdn	:ipv4
http://www.thyssenkrupp-marinesystems.org/templater.hta	www.thyssenkrupp-m…	...
ftp://185.106.120.206/pub/readme.txt	...	185.106.120.206
http://www.thyssenkrupp-marinesystems.org/templater.doc	www.thyssenkrupp-m…	...

Part 2

Question 3: How can you **add a filter** to the above query to **only** show IPv4s on AS 25820?

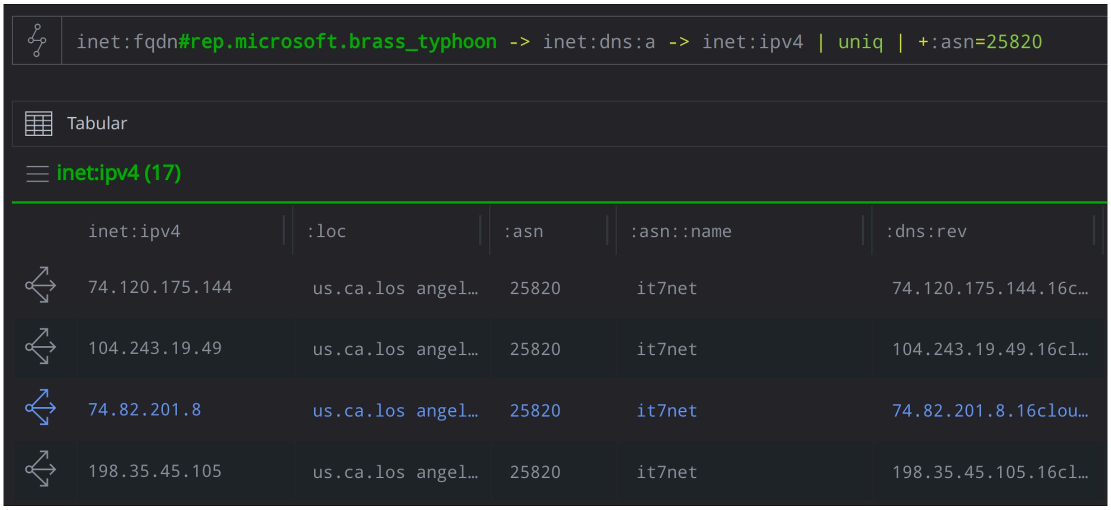
- You can filter the nodes with the following Storm:

```
inet:fqdn#rep.microsoft.brass_typhoon -> inet:dns:a
  -> inet:ipv4 | uniq | +:asn=25820
```

After switching back to Storm query mode with the **pipe** character (**|**), you're telling Synapse to **include** only those IPv4s whose **:asn** value is 25820.

(This is called a **filter by property value**).

- Running this query will produce the following:



```
inet:fqdn#rep.microsoft.brass_typhoon -> inet:dns:a -> inet:ipv4 | uniq | +:asn=25820
```

Tabular

inet:ipv4 (17)

inet:ipv4	:loc	:asn	:asn::name	:dns:rev
74.120.175.144	us.ca.los angel…	25820	it7net	74.120.175.144.16c…
104.243.19.49	us.ca.los angel…	25820	it7net	104.243.19.49.16cl…
74.82.201.8	us.ca.los angel…	25820	it7net	74.82.201.8.16clou…
198.35.45.105	us.ca.los angel…	25820	it7net	198.35.45.105.16cl…

> **Tip:** you only need to provide the **relative property name** (`:asn`) for the filter. Synapse knows that the nodes that are "inbound" to the filter operation are `inet:ipv4` nodes, so you don't need to include the form name.
>
> The filter will work the same way if you use the **full property name** (`+inet:ipv4:asn=25820`), but using the **relative** name saves you some typing!

Question 4: How can you add a filter to your query to view **only** those IPs reported by Microsoft (**`rep.microsoft`**)?

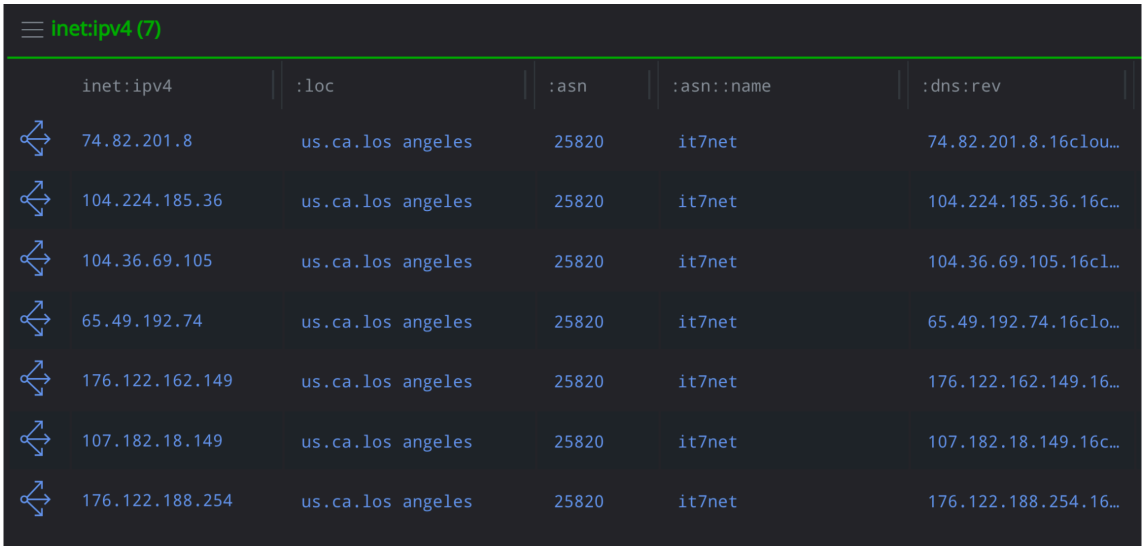
- You can filter the nodes with the following Storm:

```
inet:fqdn#rep.microsoft.brass_typhoon -> inet:dns:a
  -> inet:ipv4 | uniq | +:asn=25820 +#rep.microsoft
```

You're telling Synapse to only **include** indicators tagged `rep.microsoft`.

(This is called a **filter by tag**).

- Incorporating this filter reduces our results from 17 **`inet:ipv4`** nodes to 7:



inet:ipv4 (7)

inet:ipv4	:loc	:asn	:asn::name	:dns:rev
74.82.201.8	us.ca.los angeles	25820	it7net	74.82.201.8.16clou…
104.224.185.36	us.ca.los angeles	25820	it7net	104.224.185.36.16c…
104.36.69.105	us.ca.los angeles	25820	it7net	104.36.69.105.16cl…
65.49.192.74	us.ca.los angeles	25820	it7net	65.49.192.74.16clo…
176.122.162.149	us.ca.los angeles	25820	it7net	176.122.162.149.16…
107.182.18.149	us.ca.los angeles	25820	it7net	107.182.18.149.16c…
176.122.188.254	us.ca.los angeles	25820	it7net	176.122.188.254.16…

Tip: you only need to specify "enough" of the tag to get what you want. In this case "things reported by Microsoft" all fall under the **`rep.microsoft`** portion of the tag tree. This includes **`rep.microsoft.brass_typhoon`** but would also include **`rep.microsoft.midnight_blizzard`**, for example.

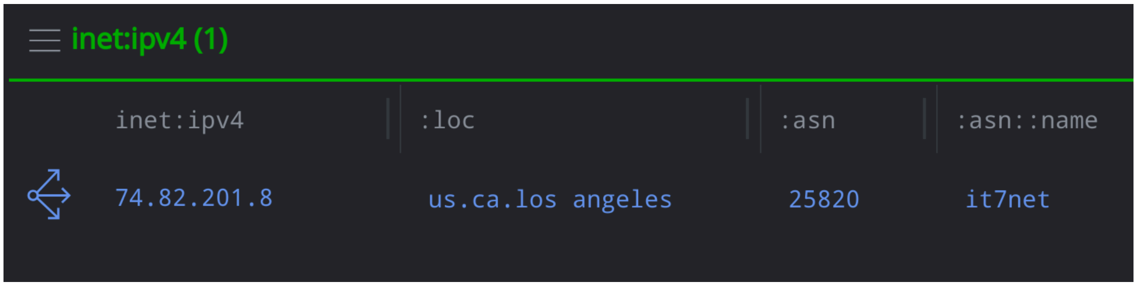
Using the "higher level" tag in your filter gets you what you want without having to individually specify any / all leaf tags.

Question 5: How can you add a filter to your query to view **only** those IPs reported by Microsoft (**`rep.microsoft`**) **and** Mandiant (**`rep.mandiant`**)? How many IPs were reported by both organizations?

- You can filter the nodes with the following Storm:

```
inet:fqdn#rep.microsoft.brass_typhoon -> inet:dns:a
  -> inet:ipv4 | uniq | +:asn=25820 +#rep.microsoft
  +#rep.mandiant
```

One IPv4 address was reported by both Microsoft (as Brass Typhoon) and Mandiant (as APT41):



inet:ipv4 (1)

inet:ipv4	:loc	:asn	:asn::name
74.82.201.8	us.ca.los angeles	25820	it7net

Filters with Mathematical Operators

Exercise 2 Answer

Objective:

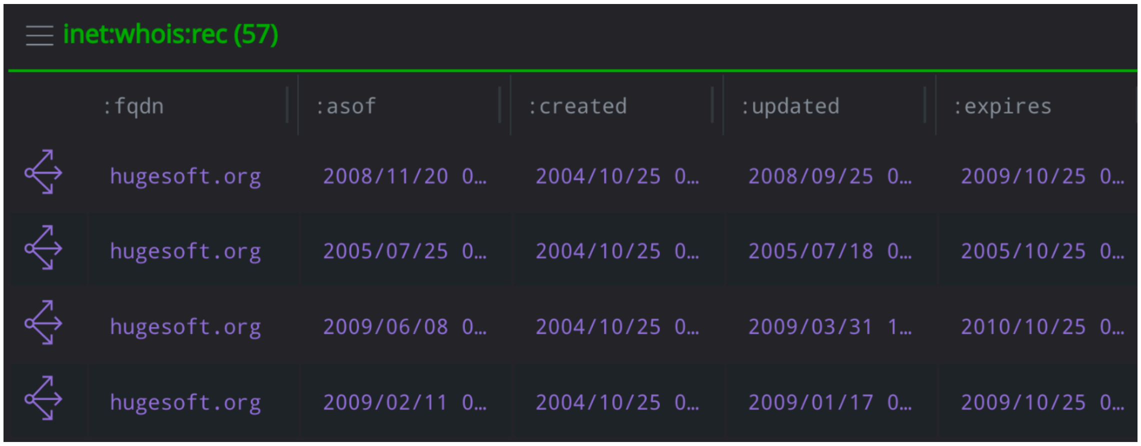
- **Use mathematical operators to perform filter operations with Storm.**

Question 1: How can you **add a filter** to your query to **only** display WhoIs records created **before** January 11, 2014 (the date Kleissner & Associates registered / sinkholed the domain)?

- You can filter the WhoIs records with the following Storm:

```
inet:fqdn=hugesoft.org -> inet:whois:rec +:created<2014/01/11
```

You're telling Synapse to **include** whois records with a registration (`:created`) date **less than** (earlier than) January 11, 2014:



inet:whois:rec (57)

:fqdn	:asof	:created	:updated	:expires
hugesoft.org	2008/11/20 0…	2004/10/25 0…	2008/09/25 0…	2009/10/25 0…
hugesoft.org	2005/07/25 0…	2004/10/25 0…	2005/07/18 0…	2005/10/25 0…
hugesoft.org	2009/06/08 0…	2004/10/25 0…	2009/03/31 1…	2010/10/25 0…
hugesoft.org	2009/02/11 0…	2004/10/25 0…	2009/01/17 0…	2009/10/25 0…

Because Synapse stores dates as integer values, we can easily perform mathematical comparisons and mathematical operations using date/time values!

Filters with Extended Operators

Exercise 3 Answer

Objective:

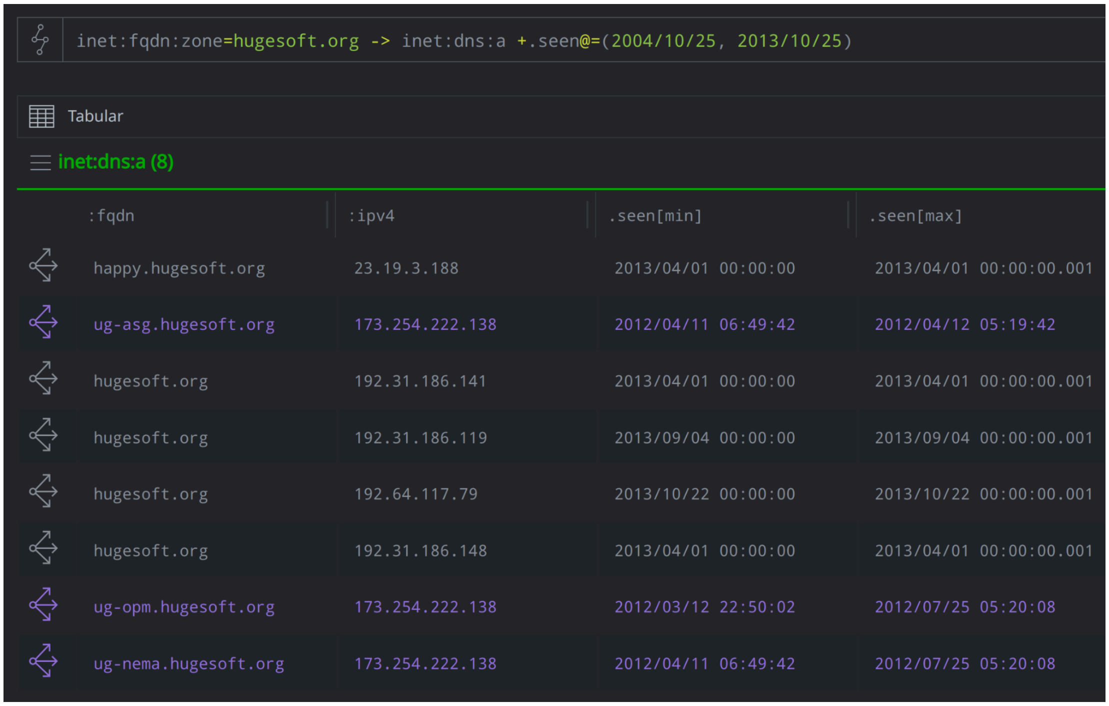
- **Use extended operators to perform filter operations in Storm.**

Question 1: How can you **add a filter** to the query above to **only** display DNS A records observed (**.seen**) between those dates?

- You can filter the DNS A records with the following Storm:

```
inet:fqdn:zone=hugesoft.org -> inet:dns:a
  +.seen@=(2004/10/25, 2013/10/25)
```

You're using Synapse's **time / interval operator** to tell Synapse to **include** only those records whose **.seen** time overlaps with the specified dates:



```
inet:fqdn:zone=hugesoft.org -> inet:dns:a +.seen@=(2004/10/25, 2013/10/25)
```

inet:dns:a (8)

	:fqdn	:ipv4	.seen[min]	.seen[max]
	happy.hugesoft.org	23.19.3.188	2013/04/01 00:00:00	2013/04/01 00:00:00.001
	ug-asg.hugesoft.org	173.254.222.138	2012/04/11 06:49:42	2012/04/12 05:19:42
	hugesoft.org	192.31.186.141	2013/04/01 00:00:00	2013/04/01 00:00:00.001
	hugesoft.org	192.31.186.119	2013/09/04 00:00:00	2013/09/04 00:00:00.001
	hugesoft.org	192.64.117.79	2013/10/22 00:00:00	2013/10/22 00:00:00.001
	hugesoft.org	192.31.186.148	2013/04/01 00:00:00	2013/04/01 00:00:00.001
	ug-opm.hugesoft.org	173.254.222.138	2012/03/12 22:50:02	2012/07/25 05:20:08
	ug-nema.hugesoft.org	173.254.222.138	2012/04/11 06:49:42	2012/07/25 05:20:08

Tip: Synapse understands many formats for date/time values. When entering dates in `YYYY/MM/DD` format, we include the forward slashes (`/`) for clarity, but they are not required. The following format also works: `+.seen@=(20041025, 20131025)`.

Question 2: How many DNS A records are in your results after adding the filter operation?

- After adding the filter there are **eight** DNS A records (from more than 300 originally).