

# **Cyber Event Database Report**

By Ethan Prendergast

SQL Scripts:

- create.sql
- insert.sql
- drop.sql
- queries.sql

Documentation:

- Database Schema
- Database Population
- Non-Trivial Query 1
- Reflection Query 1
- Comprehensive Test Data 1
- Non-Trivial Query 2
- Reflection Query 2
- Comprehensive Test Data 2

## Database Schema

The describe command shows a description of the table's schema

```
1 •  describe naics;
2 •  describe isocc;
3 •  describe cyber_events;
4 •  describe event_subtypes;
```

Result Grid   Filter Rows: _____   Export: _____   Wrap Cell Content: _____						
	Field	Type	Null	Key	Default	Extra
Naics	naics_code	int	NO	PRI	NULL	
	naics_description	varchar(255)	YES		NULL	

Naics

Result Grid   Filter Rows: _____   Export: _____   Wrap Cell Content: _____						
	Field	Type	Null	Key	Default	Extra
Isocc	c_code	char(3)	NO	PRI	NULL	
	c_name	varchar(255)	NO		NULL	

Isocc

Result Grid   Filter Rows: _____   Export: _____   Wrap Cell Content: _____						
	Field	Type	Null	Key	Default	Extra
Cyber_events	e_id	char(16)	NO	PRI	NULL	
	e_date	char(10)	NO		NULL	
	e_year	int	NO		NULL	
	e_month	int	NO		NULL	
	actor	varchar(100)	NO		NULL	
	actor_type	varchar(50)	NO		NULL	
	organization	varchar(100)	NO		NULL	
	industry_code	int	NO	MUL	NULL	
	motive	varchar(50)	NO		NULL	
	e_type	char(20)	NO		NULL	
	e_description	varchar(500)	NO		NULL	
	source_url	varchar(200)	NO		NULL	
	target_country	char(3)	NO	MUL	NULL	
	actor_country	char(3)	NO	MUL	NULL	

Cyber\_events

Result Grid   Filter Rows: _____   Export: _____   Wrap Cell Content: _____						
	Field	Type	Null	Key	Default	Extra
Event_sybtypes	e_id	char(16)	NO	PRI	NULL	
	e_subtype	varchar(50)	NO	PRI	NULL	

Event\_sybtypes

## Database Population

The following queries show the number of tuples in each table

```
# table populations
select count(*) AS industries from naics;
select count(*) AS countries from isocc;
select count(*) AS events from cyber_events;
select count(*) AS events_and_subtypes from event_subtypes;
```

Result Grid		Filter Rows:	Export:	Wrap Cell Content:
	industries			

▶ 11

Result Grid		Filter Rows:	Export:	Wrap Cell Content:
	countries			

▶ 13

Result Grid		Filter Rows:	Export:	Wrap Cell Content:
	events			

▶ 27

Result Grid		Filter Rows:	Export:	Wrap Cell Content:
	events_and_subtypes			

▶ 30

(There are more tuples in event\_subtypes as some attacks were mixed, and had several subtypes for one event)

## Non-Trivial Query 1

For each cyber event where the actor country is USA, list the event information.

Order the results by target country name and for the same target country, order the results by the event date  
(target\_country\_name, e\_date, e\_id, e\_type, industry\_description, motive)

Query	<pre>select c_name target_country_name, e_date, e_id, e_type, naics_description industry_description, motive from naics N join (cyber_events CE join isocc I on CE.target_country = I.c_code) on N.naics_code = CE.industry_code where CE.actor_country = 'USA' order by CE.target_country, CE.e_date DESC;</pre>
-------	---

Answer	<table border="1"><thead><tr><th>target_country_name</th><th>e_date</th><th>e_id</th><th>e_type</th><th>industry_description</th><th>motive</th></tr></thead><tbody><tr><td>Iran (Islamic Republic of)</td><td>2024-02-15</td><td>47f00a8ccc43d5da</td><td>Disruptive</td><td>Transportation and Warehousing</td><td>Sabotage</td></tr><tr><td>Russian Federation</td><td>2024-02-14</td><td>ea1304bf4b5116d6</td><td>Disruptive</td><td>Public Administration</td><td>Undetermined</td></tr><tr><td>United States of America</td><td>2024-04-03</td><td>2d89a9ffc0ae60c9</td><td>Exploitive</td><td>Undetermined</td><td>Espionage</td></tr></tbody></table>	target_country_name	e_date	e_id	e_type	industry_description	motive	Iran (Islamic Republic of)	2024-02-15	47f00a8ccc43d5da	Disruptive	Transportation and Warehousing	Sabotage	Russian Federation	2024-02-14	ea1304bf4b5116d6	Disruptive	Public Administration	Undetermined	United States of America	2024-04-03	2d89a9ffc0ae60c9	Exploitive	Undetermined	Espionage
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United States of America	2024-04-03	2d89a9ffc0ae60c9	Exploitive	Undetermined	Espionage																				

## Reflection Query 1

The following query shows the total list of cyber\_events with actor countries. Events with USA as the actor country are highlighted in red

Query	<pre><code>select c_name target_country_name, e_date, e_id, e_type, naics_description industry_description, motive, actor_country  from naics N join (cyber_events CE join isocc I on CE.target_country = I.c_code) on N.naics_code = CE.industry_code;</code></pre>																																																																																																																																																																																																				
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America	2024-03-01	74ab0e2986e5a54b	Exploitive	Information	Financial	UND	Ukraine	2024-01-02	897793b71365a2ff	Exploitive	Information	Sabotage	RUS	United States of America	2024-05-21	d8c669598a1c1d6e	Exploitive	Information	Financial	UND	Ukraine	2024-03-19	ef172bf0779be9d7	Mixed	Information	Sabotage	RUS	Iran (Islamic Republic of)	2024-08-14	ft8770g40e9gqxu4	Exploitive	Finance and Insurance	Financial	UND	Undetermined	2024-09-02	1a223c9e04046912	Exploitive	Professional, Scientific, and Tec...	Undetermined	UND	United States of America	2024-02-14	88963111a5a550d1	Disruptive	Professional, Scientific, and Tec...	Protest	RUS	Australia	2024-01-22	b9a7924fd4fdeb37	Exploitive	Professional, Scientific, and Tec...	Financial	UND	Russian Federation	2024-04-10	9016f06fda573322	Exploitive	Administrative and Support and ...	Protest	UKR	United States of America	2024-05-08	01e9862f655cf85	Mixed	Health Care and Social Assistance	Financial	RUS	United States of America	2024-06-28	3d71ca29f703ffbc	Mixed	Health Care and Social Assistance	Financial	UND	Israel	2024-01-23	668228a28ac0743e	Disruptive	Arts, Entertainment, and Recre...	Protest	TUR	United Kingdom of Grea...	2024-03-14	60b86709daca0f54	Disruptive	Public Administration	Sabotage	UND	Canada	2024-03-05	779bbcc0aa08950b	Disruptive	Public Administration	Financial	UND	United States of America	2024-01-18	89e7cc0b666aff40	Mixed	Public Administration	Financial	UND	Colombia	2024-01-26	b0d16e97f2a79f1e	Disruptive	Public Administration	Financial	UND	Russian Federation	2024-02-14	ea1304bf4b5116d6	Disruptive	Public Administration	Undetermined	USA	United States of America	2024-04-03	2d89a9ffc0ae60c9	Exploitive	Undetermined	Espionage	USA
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## Comprehensive Data 1

The following query shows each country that was an actor in a cyber event, and how many times they were an actor in a cyber event. The second answer shown is the reflection query highlighted to also showcase the number of times Ukraine was an actor

Query	<pre><code>select c_code country_code, c_name country_name, count(*) AS actorInstances from isocc l join cyber_events CE on l.c_code = CE.actor_country group by c_code;</code></pre>
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Answer	<p>Result Grid   Filter Rows: _____   Export:   Wrap Cell Content: <input type="checkbox"/></p> <table border="1"> <thead> <tr> <th>country_code</th><th>country_name</th><th>actorInstances</th></tr> </thead> <tbody> <tr> <td>ISR</td><td>Israel</td><td>1</td></tr> <tr> <td>RUS</td><td>Russian Federation</td><td>6</td></tr> <tr> <td>TUR</td><td>Turkey</td><td>1</td></tr> <tr> <td>UKR</td><td>Ukraine</td><td>2</td></tr> <tr> <td>UND</td><td>Undetermined</td><td>14</td></tr> <tr> <td>USA</td><td>United States of America</td><td>3</td></tr> </tbody> </table>	country_code	country_name	actorInstances	ISR	Israel	1	RUS	Russian Federation	6	TUR	Turkey	1	UKR	Ukraine	2	UND	Undetermined	14	USA	United States of America	3
country_code	country_name	actorInstances																				
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RUS	Russian Federation	6																				
TUR	Turkey	1																				
UKR	Ukraine	2																				
UND	Undetermined	14																				
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Result Grid   Filter Rows: _____   Export:   Wrap Cell Content: <input type="checkbox"/>						
target_country_name	e_date	e_id	e_type	industry_description	motive	actor_country
Ukraine	2024-01-25	006f7f1a20156254	Disruptive	Utilities	Sabotage	UND
United States of America	2024-01-16	60c10acd4e7407c6	Disruptive	Utilities	Undetermined	RUS
Lebanon	2024-09-26	a05b194a6a6d9701	Disruptive	Utilities	Sabotage	ISR
United States of America	2024-03-06	c25a87e8cf43fa59	Exploitive	Retail Trade	Financial	UND
Estonia	2024-04-25	27ac800a4c7a20ea	Disruptive	Transportation and Warehousing	Sabotage	RUS
Iran (Islamic Republic of)	2024-02-15	47f00a8ccc43d5da	Disruptive	Transportation and Warehousing	Sabotage	USA
United States of America	2024-01-23	58340973ee0c5732	Mixed	Transportation and Warehousing	Financial	UND
Undetermined	2024-06-28	65e07ba91f3d29c8	Exploitive	Transportation and Warehousing	Financial	UND
Russian Federation	2024-01-09	430028dee10aff28	Disruptive	Information	Protest	UKR
United States of America	2024-03-01	74ab0e2986e5a54b	Exploitive	Information	Financial	UND
Ukraine	2024-01-02	897793b71365a2ff	Exploitive	Information	Sabotage	RUS
United States of America	2024-05-21	d8c669598a1c1d6e	Exploitive	Information	Financial	UND
Ukraine	2024-03-19	ef172bf0779be9d7	Mixed	Information	Sabotage	RUS
Iran (Islamic Republic of)	2024-08-14	ft8770g40e9gqxu4	Exploitive	Finance and Insurance	Financial	UND
Undetermined	2024-09-02	1a223c9e04046912	Exploitive	Professional, Scientific, and Tec...	Undetermined	UND
United States of America	2024-02-14	88963111a5a550d1	Disruptive	Professional, Scientific, and Tec...	Protest	RUS
Australia	2024-01-22	b9a7924fd4fdcb37	Exploitive	Professional, Scientific, and Tec...	Financial	UND
Russian Federation	2024-04-10	9016f06fd573322	Exploitive	Administrative and Support and ...	Protest	UKR
United States of America	2024-05-08	01e9862f655cfdb85	Mixed	Health Care and Social Assistance	Financial	RUS
United States of America	2024-06-28	3d71ca29f703fbcc	Mixed	Health Care and Social Assistance	Financial	UND
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United Kingdom of Great Britain and Northern Ireland	2024-03-14	60b86709daca0f54	Disruptive	Public Administration	Sabotage	UND
Canada	2024-03-05	779bbcc0aa08950b	Disruptive	Public Administration	Financial	UND
United States of America	2024-01-18	89e7cc0b666aff40	Mixed	Public Administration	Financial	UND
Colombia	2024-01-26	b0d16e97f2a79f1e	Disruptive	Public Administration	Financial	UND
Russian Federation	2024-02-14	ea130-b6fb5116d6	Disruptive	Public Administration	Undetermined	USA
United States of America	2024-04-03	2d89a9ffc0ae60c9	Exploitive	Undetermined	Espionage	USA

Test data shows that the number of actor countries is varied with 6 unique actor countries, and the count provided for the NTQ is accurate.

## Non-Trivial Query 2

For each event subtype appearing in the event\_subtypes table, determine the number of events with that subtype. Order the results so that the event subtype with the most events is listed first and for those having the same number of events, order the results alphabetically by event subtype  
(event\_subtype, numberOfEvents)

Query

```
select e_subtype event_subtype, count(*) AS numberOfEvents
  from event_subtypes
 group by e_subtype
 order by numberOfEvents DESC , e_subtype;
```

Answer

The screenshot shows a database query result grid. The grid has two columns: 'event\_subtype' and 'numberOfEvents'. The data is sorted by 'numberOfEvents' in descending order, and within each count, it is sorted alphabetically by 'event\_subtype'. The results are as follows:

	event_subtype	numberOfEvents
▶	Exploitation of Application Server	6
	Data Attack	5
	Physical Attack	4
	Message Manipulation	3
	Undetermined	3
	Exploitation of End Host	2
	Exploitation of Network Infrastructure	2
	External Denial of Service	2
	Exploitation of Data in Transit	1
	Exploitation of Sensors	1
	Internal Denial of Service	1

## Reflection Query 2

Illustrates the events and their subtypes

Query	<pre>select *\nfrom event_subtypes\norder by e_subtype;</pre>																																																																		
Answer	<p>Result Grid   Filter Rows: _____   Edit:    Export/Import:    Wrap Cell Content: </p> <table border="1"><thead><tr><th>e_id</th><th>e_subtype</th></tr></thead><tbody><tr><td>01e9862f655cf85</td><td>Data Attack</td></tr><tr><td>89e7cc0b666aff40</td><td>Data Attack</td></tr><tr><td>3d71ca29f703ffbc</td><td>Data Attack</td></tr><tr><td>430028dee10aff28</td><td>Data Attack</td></tr><tr><td>58340973ee0c5732</td><td>Data Attack</td></tr><tr><td>ft8770g40e9gqxu4</td><td>Exploitation of Application Server</td></tr><tr><td>d8c669598a1c1d6e</td><td>Exploitation of Application Server</td></tr><tr><td>89e7cc0b666aff40</td><td>Exploitation of Application Server</td></tr><tr><td>74ab0e2986e5a54b</td><td>Exploitation of Application Server</td></tr><tr><td>58340973ee0c5732</td><td>Exploitation of Application Server</td></tr><tr><td>01e9862f655cf85</td><td>Exploitation of Application Server</td></tr><tr><td>65e07ba91f3d29c8</td><td>Exploitation of Data in Transit</td></tr><tr><td>c25a87e8cf43fa59</td><td>Exploitation of End Host</td></tr><tr><td>2d89a9ffc0ae60c9</td><td>Exploitation of End Host</td></tr><tr><td>b9a7924fd4fdeb37</td><td>Exploitation of Network Infrastructure</td></tr><tr><td>1a223c9e04046912</td><td>Exploitation of Network Infrastructure</td></tr><tr><td>9016f06fda573322</td><td>Exploitation of Sensors</td></tr><tr><td>006f7t1a20156254</td><td>External Denial of Service</td></tr><tr><td>88963111a5a550d1</td><td>External Denial of Service</td></tr><tr><td>779bcc0aa08950b</td><td>Internal Denial of Service</td></tr><tr><td>b0d16e97f2a79f1e</td><td>Message Manipulation</td></tr><tr><td>668228a28ac0743e</td><td>Message Manipulation</td></tr><tr><td>ea1304bf4b5116d6</td><td>Message Manipulation</td></tr><tr><td>27ac800a4c7a20ea</td><td>Physical Attack</td></tr><tr><td>a05b194a6a6d9701</td><td>Physical Attack</td></tr><tr><td>60c10acd4e7407c6</td><td>Physical Attack</td></tr><tr><td>60b86709daca0f54</td><td>Physical Attack</td></tr><tr><td>897793b71365a2ff</td><td>Undetermined</td></tr><tr><td>ef172bf0779be9d7</td><td>Undetermined</td></tr><tr><td>47f00a8ccc43d5da</td><td>Undetermined</td></tr><tr><td>*</td><td></td></tr><tr><td></td><td></td></tr></tbody></table>	e_id	e_subtype	01e9862f655cf85	Data Attack	89e7cc0b666aff40	Data Attack	3d71ca29f703ffbc	Data Attack	430028dee10aff28	Data Attack	58340973ee0c5732	Data Attack	ft8770g40e9gqxu4	Exploitation of Application Server	d8c669598a1c1d6e	Exploitation of Application Server	89e7cc0b666aff40	Exploitation of Application Server	74ab0e2986e5a54b	Exploitation of Application Server	58340973ee0c5732	Exploitation of Application Server	01e9862f655cf85	Exploitation of Application Server	65e07ba91f3d29c8	Exploitation of Data in Transit	c25a87e8cf43fa59	Exploitation of End Host	2d89a9ffc0ae60c9	Exploitation of End Host	b9a7924fd4fdeb37	Exploitation of Network Infrastructure	1a223c9e04046912	Exploitation of Network Infrastructure	9016f06fda573322	Exploitation of Sensors	006f7t1a20156254	External Denial of Service	88963111a5a550d1	External Denial of Service	779bcc0aa08950b	Internal Denial of Service	b0d16e97f2a79f1e	Message Manipulation	668228a28ac0743e	Message Manipulation	ea1304bf4b5116d6	Message Manipulation	27ac800a4c7a20ea	Physical Attack	a05b194a6a6d9701	Physical Attack	60c10acd4e7407c6	Physical Attack	60b86709daca0f54	Physical Attack	897793b71365a2ff	Undetermined	ef172bf0779be9d7	Undetermined	47f00a8ccc43d5da	Undetermined	*			
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## Comprehensive Data 2

Illustrates each unique event subtype present in the table

Query    **select distinct e\_subtype from event\_subtypes;**

Result Grid	Filter Rows:	Export:	Wrap Cell Content:												
<table border="1"><thead><tr><th>e_subtype</th></tr></thead><tbody><tr><td>External Denial of Service</td></tr><tr><td>Data Attack</td></tr><tr><td>Exploitation of Application Server</td></tr><tr><td>Exploitation of Network Infrastructure</td></tr><tr><td>Physical Attack</td></tr><tr><td>Exploitation of End Host</td></tr><tr><td>Undetermined</td></tr><tr><td>Exploitation of Data in Transit</td></tr><tr><td>Message Manipulation</td></tr><tr><td>Internal Denial of Service</td></tr><tr><td>Exploitation of Sensors</td></tr></tbody></table>				e_subtype	External Denial of Service	Data Attack	Exploitation of Application Server	Exploitation of Network Infrastructure	Physical Attack	Exploitation of End Host	Undetermined	Exploitation of Data in Transit	Message Manipulation	Internal Denial of Service	Exploitation of Sensors
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Test data shows that all 11 subtypes are present in the table, meaning that every subtype is represented in the data at least once.