

# **Republic of Palau - Financial Intelligence Unit**

## **Executive Summary**

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Development Partner, Nelson J. Werner & Hussein “Boboy” Derbai

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### **I. About the Organization**

#### **Organization**

The Financial Intelligence Unit (FIU) of the Republic of Palau is an autonomous organization which reports to the Governing Board of Commissioners of Financial Institutions Commission (FIC). FIC is responsible for the oversight, supervision and regulation of the Republic of Palau’s financial sector and the Governing Board members are appointed by the President of the Republic of Palau.

The mission statement of the FIU is,

*To detect, disrupt and deter money laundering and terrorist financing. To ensure that Palau anti money laundering regime complies with international standards. To that end, the financial intelligence unit collects, analyzes and stores financial data and intelligence for possible money laundering and terrorists financing prosecution.*

The vision statement of the FIU is,

*For Palau to be free of money laundering and terrorist financing.*

The Financial Intelligence Unit strives to achieve its mission by receiving and analyzing information from various sources to identify possible activities related to money laundering or terrorist financing. The current sources of information are the three retail banks in the country, i.e. Bank of Hawaii, Bank of Guam, and Bank Pacific, and the Bureau of Customs and Border Protection. All the three banks share their information with FIU by generating Currency Transaction Reports (CTR) and Suspicious Activity Report (SAR) or Suspicious Transaction Report (STR). A Currency Transaction Report (CTR) is a report that financial institutions are required to file to the FIU for each deposit, withdrawal, exchange of currency, or other payment or transfer, by, through, or to the financial institution which involves a transaction in currency of more than \$10,000.

A Suspicious Activity Report (SAR) or Suspicious Transaction Report (STR) is a report made by a financial institution about the suspicious or potentially suspicious activity. The report must be made when any financial transaction that does not make sense to the financial institution, is unusual for that client or appears to be done only for hiding or obfuscating a transaction.

The FIU, along with TCinGC program of Carnegie Mellon University, has successfully developed a sophisticated database for the electronic acquisition of financial data. Along with the database there is a RAIDER application developed that visualizes and provides a summary of the data that is more readable to an outside user. In addition, for effective dissemination and investigation of money laundering, the FIU has created a Financial Crimes Investigations Unit (FCIU) with other relevant law enforcement agencies such as the Bureau of Customs and Border Police, the Office of Attorney General, the Office of Special Prosecutor, the Bureau of Revenue and Taxation Criminal Investigation Division, the Postal Inspector and the Bureau of Public Safety. The FIU identifies and

analyzes suspicious or illegal activity and passes its amassed intelligence to the FCIU for further investigation.

## **Facilities**

The Financial Intelligence Unit is located in an office on the second floor of the IA Meda Korner Building in Koror, Palau. It shares the second-floor facilities with the Financial Institutions Commission (FIC). To this end, the Financial Intelligence Unit and the Financial Institutions Commission work together to monitor financial activity in Palau. In terms of physical space and organization, the size, furnishings, and layout are adequate for the current operations of the Financial Intelligence Unit. There are three desks in the office, which are used by Nelson(Director) and Boboy(Senior Intelligence Analyst) for day-to-day work, as well as a larger conference table used for meetings. At two of the desks is a desktop computer; there are an additional three laptops in the office. The access to power at the Financial Intelligence Unit office is also satisfactory for its needs: there are sufficient power outlets in the office to power all of the electronic devices (i.e. – computers, phones, etc.) the Financial Intelligence Unit has, as well as those of guests, and sufficient power to provide climate control and lighting for the office. The security to the office is also ample, being that the door to the Financial Intelligence Unit office is locked at night, as is the door to the second floor that contains the Financial Intelligence Unit and Financial Institutions Commission offices.

## **Programs**

The major activity for FIU is to digitize the paper trail which is the information passed on by the financial institutions, analyze the information and create a storyboard that is worked upon by the investigators to reprimand the culprit involved in suspicious transactions that may lead to money laundering.

The FIU receives information from the local retail banks and the Bureau of Customs and Border Protection and stores it for intelligence gathering. During analysis, this information is utilized to find any evidence trail of money laundering. Before 2015, the information was paper-driven. Searching and analyzing information was next to impossible. Therefore, the whole process was digitized during 2015. Currently, the FIU has a digital database in place and all the three retail banks send the CTRs and STRs in csv format. Hussein ‘Boboy’ Derbai, Senior Intelligence Analyst at the FIU, needs to retrieve the data from the bank-specific portal within a limited timeframe. Moreover, the CTRs and STRs transmitted by the bank have minor errors. Therefore, he goes through the data manually to check for such errors before importing it into the database. There are currently over 18,000 CTRs and 300 – 400 STRs currently in the database.

## **Staff**

Currently, there are two full-time employees in the Financial Intelligence Unit, Republic of Palau. Mr. Nelson Jay Werner is the Director of the FIU, Republic of Palau. He is responsible for the overall supervision of the FIU, which includes staff, contracts and public affairs. He is also responsible for implementing Anti-Money Laundering(AML) policies in the Republic of Palau i.e. develop, disseminate and verify compliance with policies to prevent money-laundering and terrorist financing. He also represents the FIU at international forums and conferences. Nelson uses computers for general office work, such as email, word processing, and research. His laptop is

preloaded with Microsoft Office applications (i.e. – Microsoft Word, Excel, Access, etc.) and uses Microsoft Outlook for accessing email. A lawyer by profession, his primary resource for technology training is the Internet, and while familiar with Office tools like Word and Excel, does not have extensive knowledge of how to use databases. Mr. Hussein ‘Boboy’ Derbai is the Senior Intelligence Analyst of the FIU, Republic of Palau. His role is to support the Director in the process of implementing the AML policies. He recommends the dissemination of suspicious transaction reports (STRs) to the director and supervise the process of exchanging information with foreign FIUs. His access to and use of technology is largely like Nelson’s, except that he has more proficiency in using the Financial Intelligence Unit’s current Microsoft Access database. As such, he is primarily responsible for cleaning and uploading the data on CTRs and STRs that is uploaded into the FIU’s database. Boboy’s access to technology training is like Nelson’s.

## **Technology Infrastructure**

The Financial Intelligence Unit has five computers, whose processor specs vary from Core i7 Quad-core to AMD TurionX2 Dual-Core Mobile. All computers have Microsoft Office 2007 Package Suite pre-installed. Last December, one of the desktops was replaced which is the most powerful system in the office and is used by the Senior Intelligence Analyst. Moreover, all the systems have access to the Internet via Wi-Fi (with the necessary web browser).

In terms of non-computing technology, the Financial Intelligence Unit’s office is equipped with phones (“landlines”) and a scanner/printer that is accessible over the local network.

Recently, an undersea cable was established that provides a much higher quality Internet connection on the islands. On a recent test with internet benchmark speed, the FIU’s internet bandwidth goes up to 11.6 Mbps for download and 5 Mbps for upload. This is a significant upgrade over previous Internet speeds, and allows the FIU to communicate more efficiently, as well as transfer large files between themselves at a faster rate.

## **Technology Management**

Since the staff at the Financial Intelligence Unit involve only 2 members, the current technology management plan is ad-hoc. In addition, the technology infrastructure involves just 2 user systems, one network device and one printer. Therefore, technology management at the Financial Intelligence Unit is done on a largely ‘as needed’ basis. Since Boboy is more adept to the computer hardware technology, he is responsible for solving any system issues. Boboy’s current technical expertise, as it relates to technology management, largely consists of the ability to use computers, meaning he can perform tasks such as installing software or updating virus definitions through a graphical user interface. Beyond these tasks, the Financial Intelligence Unit relies on external limited services to manage its technology infrastructure. Furthermore, they currently do not have the budget to permanently hire an external vendor like Conrad, who is a dedicated information technician for government organizations in Palau. Given this lack of external support and internal capacity, the technology management portion of the Financial Intelligence Unit’s organizational practices is limited. The data is backed up on external storage devices as they don’t have the budget for a cloud storage. All the systems have Avast Antivirus installed.

## **Technology Planning**

Technology planning at the Financial Intelligence Unit is largely done by Boboy. However, the final decision of purchase is done by Nelson. There is no specific budget allocated for IT management. However, 5.7% of the overall budget is allocated for buying office equipment. Computer equipment is bought utilizing this budget. Regarding technology planning and best practices, Nelson and Boboy gain information about comparable international practices by attending conferences on money-laundering and terrorist financing prevention and dually observing the best practices showcased there. They also communicate with the other Financial Intelligence Units in attendance about their technology infrastructure.

The current technology plan, to first establish and then incrementally enhance the database, has been in place since Nelson created a technology plan for the Financial Intelligence Unit.

## **Communication**

Internally, information at the Financial Intelligence Unit is shared verbally, using a flash drive, or through email. With external organizations, it is shared via email or phone conversation. As such, the Financial Intelligence Unit does have the capacity to share files, both internally and externally. Regarding the security of the files shared via email, the email accounts at the Financial Intelligence Unit are password-protected and have the capacity to be encrypted. Previously, bandwidth in Palau did not allow upload or download speeds above 256 kbps, which causes issues for the Financial Intelligence Unit when its employees need to communicate or share large files via the Internet. Currently, however, the bandwidth has increased, allowing the FIU to easily transfer large files both internally and externally. For its purposes, the one to one communication capacity of the Financial Intelligence Unit is appropriate for its needs.

## **Information Management**

The main role of Financial Intelligence Unit is to store all the information regarding suspected money-laundering activities and analyze them. Therefore, it handles its information management needs using a Microsoft Access database. The database application was created by two consultants participating in the Technology Consulting in the Global Community (TCinGC) program during 2015. It was further enhanced by other consultants who participated in TCinGC program through 2016 to 2018. The organizations that submit these reports to the Financial Intelligence Unit have transitioned to electronic submission now.

The FIU updates its database every Friday, and keeps three backups of the data, each on an external hard drive – one is left in the FIU office, one is left with the FIC, and another is kept in the possession of Boboy, who takes it home with him.

## **Business Systems**

FIU reports to the Governing Board of Financial Institutions Commission (FIC). Therefore, the accounting and HR processes are taken care by the FIC. Most of the administrative tasks are carried out by V. Tikei Sbal who is the office manager for FIC.

## **II. Fine-Tune the FIU database and forms to be compatible across systems**

### **Motivation**

This is the first and the most basic step going forth which would fine-tune the prior developments. The current database exists in Microsoft Access which has helped FIU digitize its massive paper trail. Although the solutions provided by student consultants of TCinGC program has been beneficial but there are certain loopholes that need to be taken care of such that the application is more sustainable to use in the coming years. Broadly they need to be taken care under the following purviews:-

Firstly, the database and the forms leveraging the database needs to be made compatible for use in the newer systems and OS. The forms were developed in a 32 bit system of Microsoft Access. These forms experience a lot of issues when pulled up in a 64 bit system. These issues did not pop up until last year December when Boboy got a new desktop. The new PC came pre-installed with a 64 bit Microsoft Access. Not only the form design does not pull up properly, there are certain system errors pop up while searching for CTRs, STRs and Cases. Because of this issue the senior intelligence analyst is only able to use his laptop for accessing the database. With newer updates coming up every year there is a high probability that the support for 32 bit Microsoft Application would end. Hence, the forms need to be modified and the macros underneath that fetches the data to be filled up needs to be changes so that it works on both the 32 bit and 64 bit systems.

Secondly, the database has some minor errors with the way the data is pulled up in the forms. These mainly pertain to the format of data. For example inconsistent decimal points pertaining to monetary data.

### **Outcomes**

The fine tuning has lead to compatible solution that would work on both 32 bit and 64 bit system with lower data format issues. The forms and related macros were identified where there was change required so that it works on both the systems.

### **Recommendation**

The network graph creation form still has an issue with the 64 bit system. The easier solution is to develop the entire form in a 64 bit system and add the compatibility in 32 bit system. But for higher sustainability the database and the forms should be moved to open source solutions that are not dependent on the system architecture.

## **III. Enhanced Analysis of Cases and STRs**

### **Motivation**

The ultimate goal of FIU in terms of their technology stack is to have an AML(anti-money laundering) software that provides similar functionalities of the UN sanctioned AML software goAML. The goAML has the components shown below in the figure. The current FIU database and the RAIDER application cover some portions of the below mentioned components. However there is a huge scope of improvement in areas of structured analysis, rule based analysis and profiling.



A major analysis requirement is to find the types or set of transactions that are of higher risk under suspicious transaction. A rule based system needs to be in place which would categorize the transactions from low to high risks and would alert FIU for the high risk transaction in real time. For example a scenario where a transaction of amount \$100,000 after multiple times wired to different account comes back to the same account should trigger an alert.

Each of the STR has a narrative attached to it which is passed on by the banks to the FIU. The senior intelligence analyst has to read through each of the narrative to identify whether the STR in question is worth pursuing as a case or not. There are certain rules that over time going through previous and current STR narratives can be modeled to define which of the cases are worth pursuing. This model can be used to identify the STRs into High/Medium/Low risk which would remove the necessity of manually reading through the narrative to identify the STR which are worth pursuing as a case.

## Outcomes

The rule based models would help classify all the STRs into categories of High/Medium/Low risk and gives the total count of the risk level rule it violates. The higher the count of the risk level should prompt the analyst to make case out of the STR without reading the narrative. The rule system followed as of now:-

### High Risk

- If wired in and immediately withdrawn in cash.
- If wired in and immediately wired out.
- People receiving significant amount of funds.

## Medium Risk

- If wired in to personal account and immediately transferred to other accounts.
- Multiple deposits under 10k in one day.
- Multiple deposits under 10k over several days.
- Receiving multiple wire in claiming to be investment fund but no business activity conducted.

## Low Risk

- If receiving multiple wire with no reasonable explanation.
- If deposited and immediately wired out over 5k.

The model executes the following pre-processing tasks to parse the narrative to check whether it conforms to the above listed rules:

- A bag of words based on the transactions pertaining to the rules is created(example deposit\_words, withdrawal\_words, wire\_words, cash\_words).
- Split the narrative into sentences.
- Get all the money terms and explicitly mentioned dates in the narrative.
- Find the sentences with the money and sentences with dates.
- Find implicitly mentioned dates(for example “on same day”) and converts them to actual explicit dates that come just before these implicit dates.(Example if a sentence has a date 10<sup>th</sup> Aug and next sentence encounters “On the same day”, then this is changed to 10<sup>th</sup> Aug).
- These pre-processing tasks help forms pairs of amount and date of transactions. Next the logic of python code checks if the STR narrative violates the rule system.

The steps to run the application is in Appendix. The output of the classification:-

A	B	C	D	E	F	G	H	I	J	K	L
STRID	First Name	Middle Name	Last Name	Bank	A/C#	narrative	Risk	High#	Medium#	Low#	
22	ALAUDDIN		ALAUDDIN	Bank of Hawaii	32602967	Due to an	Medium Risk	0	1	0	
105	Robert		Tkel	Bank of Hawaii	32555888	PRIME	High Risk	2	1	0	
106	Robert		Tkel	Bank of Hawaii	32499635	PRIME	High Risk	3	0	2	
113	Bedochel	Evron	Sadang	Bank of Hawaii	6.03E+09	 	Medium Risk	0	1	0	
115	Mohamoad	Amjad	Hossin	Bank of Hawaii	32867693	 	Medium Risk	0	1	0	
118	Felisto	Vito	Markub	Bank of Hawaii	3.74E+08	 	Medium Risk	0	1	1	
119	Ralph	F	Kanai	Bank of Hawaii	32979556	 	Medium Risk	0	1	1	
120				Bank of Hawaii		Bank of	Low Risk	0	0	0	
121	Ernestine	K	Rengil	Bank of Hawaii	00848945	PRIME:	Medium Risk	0	1	0	
122	Kelalbai	O	Teblak	Bank of Hawaii	32812473	 	High Risk	1	1	0	
123			Gemniz	Bank of Hawaii	32907270	PRIME:	High Risk	1	0	1	
124			multiple suspects	Bank of Hawaii	38047221	SITUATIO	Low Risk	0	0	0	
125	ESPERANZ	M	LARIOS	Bank of Hawaii	31106453	 	High Risk	1	1	1	
127	Hang		Tian	Bank of Hawaii	32912818	 	High Risk	1	0	0	
128	DELAINE	E	NAPOLEON	BANK OF GUAM	2.1E+08	&quot;UP	Low Risk	0	0	0	
129	JUNIOR	LARRY	HILLBROOM	BANK OF GUAM	nan		Low Risk	0	0	0	
130	Yuan		Feng	Bank of Hawaii	32667120	 	Low Risk	0	0	1	
133	Kaleb		Udui, Jr	Bank of Hawaii	32615500	 	High Risk	1	0	2	
134			SEA SKY INTERNATIONAL DEV GRP INC.	Bank of Hawaii	32715761	 	Medium Risk	0	1	0	
135	Balal		Miah	Bank of Hawaii	32714200	 	Medium Risk	0	1	1	
136	YOUNG	A	HA	BANK OF GUAM	2.1E+08	&quot;UP	Low Risk	0	0	0	
137	SOON	S	HA	BANK OF GUAM	2.1E+08	&quot;UP	Low Risk	0	0	0	
139	Xiaodong		Wu	Bank of Hawaii	6.04E+09	 	High Risk	1	1	0	
140			China Tourism Development Grp Inc	Bank of Hawaii	32476600	 	High Risk	1	0	1	
141	Wilhelm		Aichi	Bank of Hawaii	32918689	 	Medium Risk	0	1	0	
142	Shahin		Kader	Bank of Hawaii	32509851	 	Medium Risk	0	1	1	

## **Recommendations**

The current classification model is based on basic text parsing of the narrative and logically checking for each of the rules mentioned above. The narrative if transformed structurally such that each transaction's details like amount, the date the transaction was carried and description if taken out from the narrative can lead to better model. Also, this would help to build an application where the rules can be added/removed/edited dynamically by the analyst as and when new rules come into picture. This would result in a robust classification application.

## **IV. Automate the creation of Network Graph**

### **Motivation**

The biggest job of FIU is to help the investigators by passing suspicious case information. This information is passed in the form of a network graph that broadly tells a story of how the suspicious activity was conducted, which entities/individuals were involved and the account details along with the amount. The previous consultant had proposed an elegant solution of the network graph using a tool VUE. The VUE tool used the 3 reports generated from the Access database. The 3 reports had details pertaining to the wire and cash transactions and the entities involved in these transaction. But the network graph itself had to be made manually. The senior intelligence analyst needs to go through the report data and manually create a "storyboard" by dragging and dropping the nodes/relations concerned and involved pertaining to the case and STRs. This was a long process and required great attention to detail on part of intelligence analyst. A way to automate the entire process of generating the graph just by selecting the 3 reports would bring the graph generation process from hours to mere seconds with minimal interaction from the analyst.

### **Outcomes**

After careful analysis of the reports and the graph generated using the VUE, the automation required use of technology stack that was generic enough to create graphs for the cases and at the same time specific enough to cater to the needs of FIU with minimal user interaction. The result was use of an embedded noSQL database (neo4j) and java. The embedded database was the perfect choice as it inherently depicts the data in the form of relationship without need of taking up license of the database.

The final graph has the flexibility of moving around the nodes and edges connecting these nodes for better readability. The color coding in the graph is as follows:

- Red nodes represents withdrawal transaction and green nodes represents deposits.
- The red and green nodes also have the amount involved in the transaction along with the date of the transaction.
- The blue nodes depict the account of such transaction(A/C no or cash if the transaction is cash based).
- The orange nodes depict the entities involved in such transactions.

Also, the arrows represent the flow of money. The arrows are marked with either "Withdrawal" or "Deposit" with the arrow heads pointing to the same.





## **V. Additional Recommendations (for Future Consultants)**

The Palau FIU has successfully implemented a massive digital transformation from paper trails to a central data repository. The database has been effectively developed for all types of creating/viewing/editing transaction data through forms. The next stack of developments have statistical analysis reports(FIU raider), rule-based analysis and automation of time-consuming manual processes. The next stage of development would probably be including new types of transaction and application that leverage machine learning (example profiling or intelligent case tracking or automatic case creation). Thus the technology stack of FIU has already reached as stage where a significant maintenance of previous developments is required before going forth with newer developments.

- 1) There are minor issues with the current versions of application that need to be inspected and made more sustainable and less error prone.
- 2) There should a single application that should encapsulate all the prior applications/database/form as a single UI based application for easier usability and a single folder creation for all the reports, external files and graph generation.
- 3) Once the above corrections are made, look into data of the STRs and try to convert the text based narrative to only relevant numerical values which would further help to develop analytical application that assists FIU to develop preemptive measures for preventing money laundering in Palau. This would also help in developing better model for risk classification.
- 4) Develop a future technical plan to cater to the needs of FIU in tackling in newer form of transactions such as cryptocurrency. This would also involve modifying prior developments to adapt to such forms of transactions. For example incorporating such transactions in risk classification model.
- 5) Lastly, try incorporating the left out features of goAML in the context of Palau FIU.

## About the Consultant

Sudipto Das is pursuing a Masters degree in Information System and Management (Business Intelligence & Data Analytics track) at Carnegie Mellon University. He has a Bachelor degree in Computer Science and has worked for close to 3 years at the German tech giant SAP. He participated in the Technology Consulting in the Global Community Program this past summer, and will graduate from CMU this fall.

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## Appendix A Classification of STR based on risk level

### Technical Implementation


The classification scripts are written in Python, and are converted to an .exe applications which does not require installing additional modules. The applications, as well as the original code, can be found on Boboy's work desktop, as well as on Github:

#### Steps :






- 1) Download anaconda from <https://www.anaconda.com/distribution/#download-section>. Select the OS option and download it for the respective OS. Install the anaconda distribution.
- 2) Navigate to the FIU folder.

	data1	09-08-2019 15:26	File folder	
	data2	09-08-2019 15:30	File folder	
	databases	09-08-2019 15:12	File folder	
	Risk_Classification	09-08-2019 15:40	File folder	
	source_code	09-08-2019 14:15	File folder	
	webapp	09-08-2019 14:13	File folder	
	c	09-08-2019 15:09	XML Document	1 KB
	FIU	09-08-2019 15:09	Application	25 KB
	graph	09-08-2019 18:00	JSON File	3 KB

- 3) Navigate to the Risk\_Classification folder and then to the FIU folder.

5B Drive (E:) > FIU > Risk_Classification				
Name	^	Date modified	Type	Size
	FIU	09-08-2019 14:03	File folder	

5B Drive (E:) > FIU > Risk_Classification > FIU				
Name	^	Date modified	Type	Size
	__pycache__	09-08-2019 14:03	File folder	
	build	09-08-2019 13:49	File folder	
	dist	09-08-2019 14:03	File folder	
	Trial_FIU	09-08-2019 08:20	PY File	11 KB
	Trial_FIU.spec	09-08-2019 13:58	SPEC File	1 KB

- 4) Navigate to the dist folder and then to the Trial\_FIU folder. Look for the Application file “Trial\_FIU”

File Home Share View

← → ↕ ↑ > USB Drive (E:) > FIU > Risk\_Classification > FIU > dist

Quick access

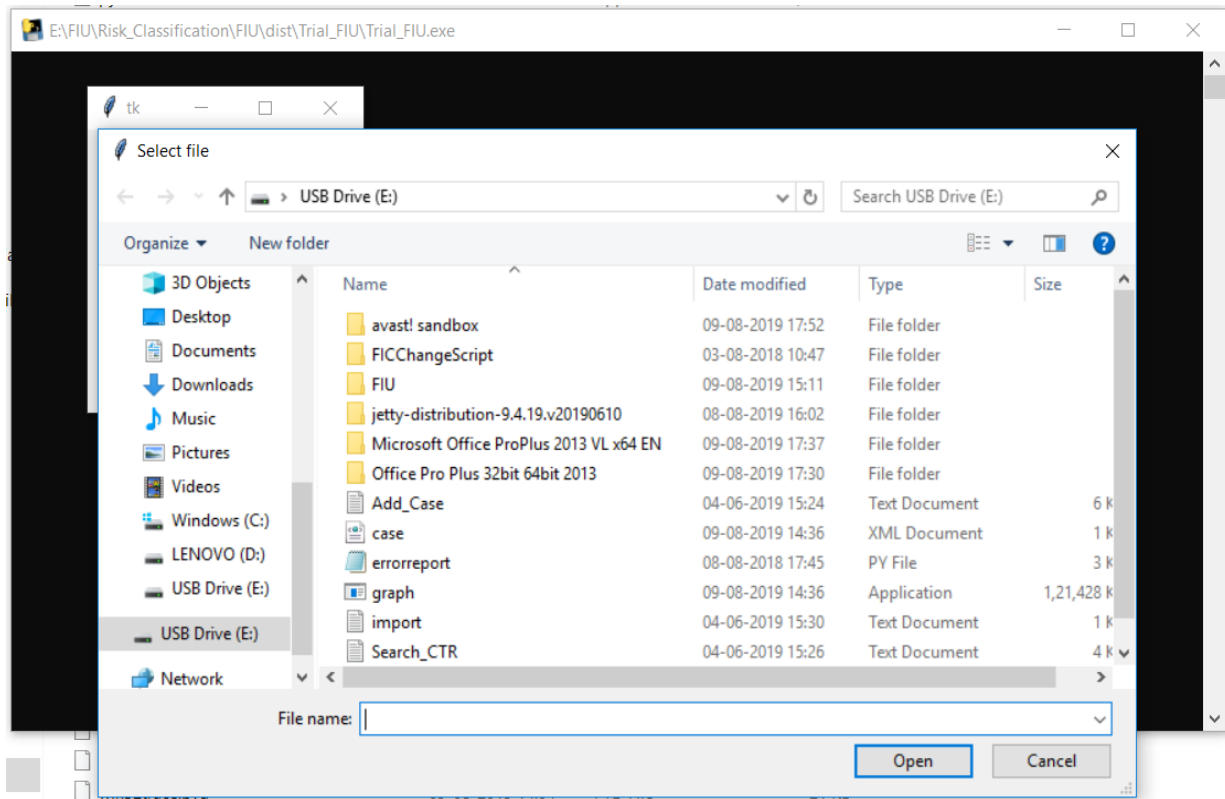
- Desktop
- Downloads

Name	Date modified	Type	Size
Trial_FIU	09-08-2019 14:10	File folder	

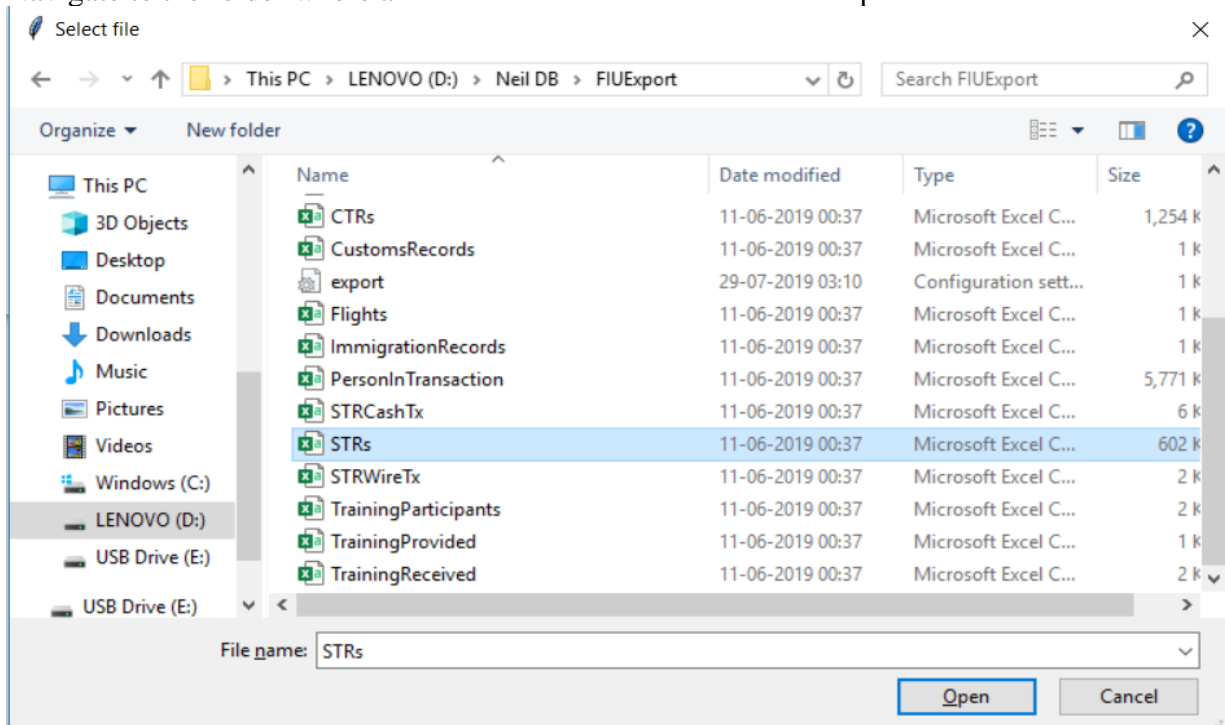
USB Drive (E:) > FIU > Risk\_Classification > FIU > dist > Trial\_FIU

Name	Date modified	Type	Size
python37.dll	09-08-2019 14:03	Application extens...	3,676 KB
pythoncom37.dll	09-08-2019 14:04	Application extens...	540 KB
pywintypes37.dll	09-08-2019 14:04	Application extens...	134 KB
Qt5Core.dll	09-08-2019 14:05	Application extens...	4,990 KB
Qt5Gui.dll	09-08-2019 14:05	Application extens...	5,786 KB
Qt5Network.dll	09-08-2019 14:05	Application extens...	1,198 KB
Qt5Qml.dll	09-08-2019 14:05	Application extens...	3,353 KB
Qt5Quick.dll	09-08-2019 14:05	Application extens...	3,385 KB
Qt5Svg.dll	09-08-2019 14:05	Application extens...	322 KB
Qt5Widgets.dll	09-08-2019 14:05	Application extens...	5,442 KB
select.pyd	09-08-2019 14:04	PYD File	19 KB
sip.pyd	09-08-2019 14:04	PYD File	106 KB
snappy.dll	09-08-2019 14:05	Application extens...	76 KB
sqlite3.dll	09-08-2019 14:05	Application extens...	1,000 KB
tcl86t.dll	09-08-2019 14:05	Application extens...	1,692 KB
tiff.dll	09-08-2019 14:05	Application extens...	617 KB
tk86t.dll	09-08-2019 14:05	Application extens...	1,446 KB
Trial_FIU	09-08-2019 14:03	Application	23,989 KB
Trial_FIU.exe.manifest	09-08-2019 14:03	MANIFEST File	2 KB
ucrtbase.dll	09-08-2019 14:03	Application extens...	993 KB

- 5) Double click on the above file and a black screen would appear It takes close to 10 - 30 seconds to open up the file browser dialog box as shown below.







- 6) Navigate to the folder where all the STR excel file is stored and “open” it.



- 7) The application will run and finally end with an output as shown below and the window would automatically close.

```
Administrator: Anaconda Prompt
1
['06/29/2018', '07/12/2018', '07/20/2018', '08/10/2018', '08/13/2018', '08/27/2018', '07/19/2018', '07/18/2018', '08/06/2018', '07/05/2018']
['Low Risk', 'Low Risk', 'Medium Risk']
0
[]
[]
0
['08/17/2018']
[]
0
[]
[]
0
[]
[]
0
[]
[]
0
[]
[]
1
['07/17/2018']
['Medium Risk']
0
[]
[]
0
[]
[]
(base) C:\WINDOWS\system32>
```

- 8) After the window is closed a csv file called risk\_classify is created in the same folder where the application resides.

 winpty.dll	09-08-2019 14:05	Application extens...	2,451 KB
 yaml.dll	09-08-2019 14:05	Application extens...	107 KB
 zlib.dll	09-08-2019 14:05	Application extens...	83 KB
 risk_classify	03-09-2019 12:04	Microsoft Excel Co...	460 KB

9) Open the above file to view the results of classification.

A	B	C	D	E	F	G	H	I	J	K	L
STRID	First Name	Middle Name	Last Name	Bank	A/C#	narrative	Risk	High#	Medium#	Low#	
22	ALAUDDIN		ALAUDDIN	Bank of Hawaii	32602967	Due to an	Medium Risk	0	1	0	
105	Robert		Tkel	Bank of Hawaii	32555888	PRIME	High Risk	2	1	0	
106	Robert		Tkel	Bank of Hawaii	32499635	PRIME	High Risk	3	0	2	
113	Bedochel	Evron	Sadang	Bank of Hawaii	6.03E+09	 	Medium Risk	0	1	0	
115	Mohamoad	Amjad	Hossin	Bank of Hawaii	32867693	 	Medium Risk	0	1	0	
118	Feliso	Vito	Markub	Bank of Hawaii	3.74E+08	 	Medium Risk	0	1	1	
119	Ralph	F	Kanai	Bank of Hawaii	32979556	 	Medium Risk	0	1	1	
120				Bank of Hawaii		Bank of	Low Risk	0	0	0	
121	Ernestine	K	Rengil	Bank of Hawaii	00848945	PRIME	Medium Risk	0	1	0	
122	Kelalbai	O	Teblak	Bank of Hawaii	32812473	 	High Risk	1	1	0	
123			Gemniz	Bank of Hawaii	32907270	PRIME	High Risk	1	0	1	
124			multiple suspects	Bank of Hawaii	38047221	SITUATIO	Low Risk	0	0	0	
125	ESPERANZ	M	LARIOS	Bank of Hawaii	31106453	 	High Risk	1	1	1	
127	Hang		Tian	Bank of Hawaii	32912818	 	High Risk	1	0	0	
128	DELAINE	E	NAPOLION	BANK OF GUAM	2.1E+08	&quot;UP	Low Risk	0	0	0	
129	JUNIOR	LARRY	HILLBROOM	BANK OF GUAM		nan	Low Risk	0	0	0	
130	Yuan		Feng	Bank of Hawaii	32667120	 	Low Risk	0	0	1	
133	Kaleb		Udui, Jr	Bank of Hawaii	32615500	 	High Risk	1	0	2	
134			SEA SKY INTERNATIONAL DEV GRP INC.	Bank of Hawaii	32715761	 	Medium Risk	0	1	0	
135	Balal		Miah	Bank of Hawaii	32714200	 	Medium Risk	0	1	1	
136	YOUNG	A	HA	BANK OF GUAM	2.1E+08	&quot;UP	Low Risk	0	0	0	
137	SOON	S	HA	BANK OF GUAM	2.1E+08	&quot;UP	Low Risk	0	0	0	
139	Xiaodong		Wu	Bank of Hawaii	6.04E+09	 	High Risk	1	1	0	
140			China Tourism Development Grp Inc	Bank of Hawaii	32476600	 	High Risk	1	0	1	
141	Wilhelm		Aichi	Bank of Hawaii	32918689	 	Medium Risk	0	1	0	
142	Shahin		Kader	Bank of Hawaii	32509851	 	Medium Risk	0	1	1	

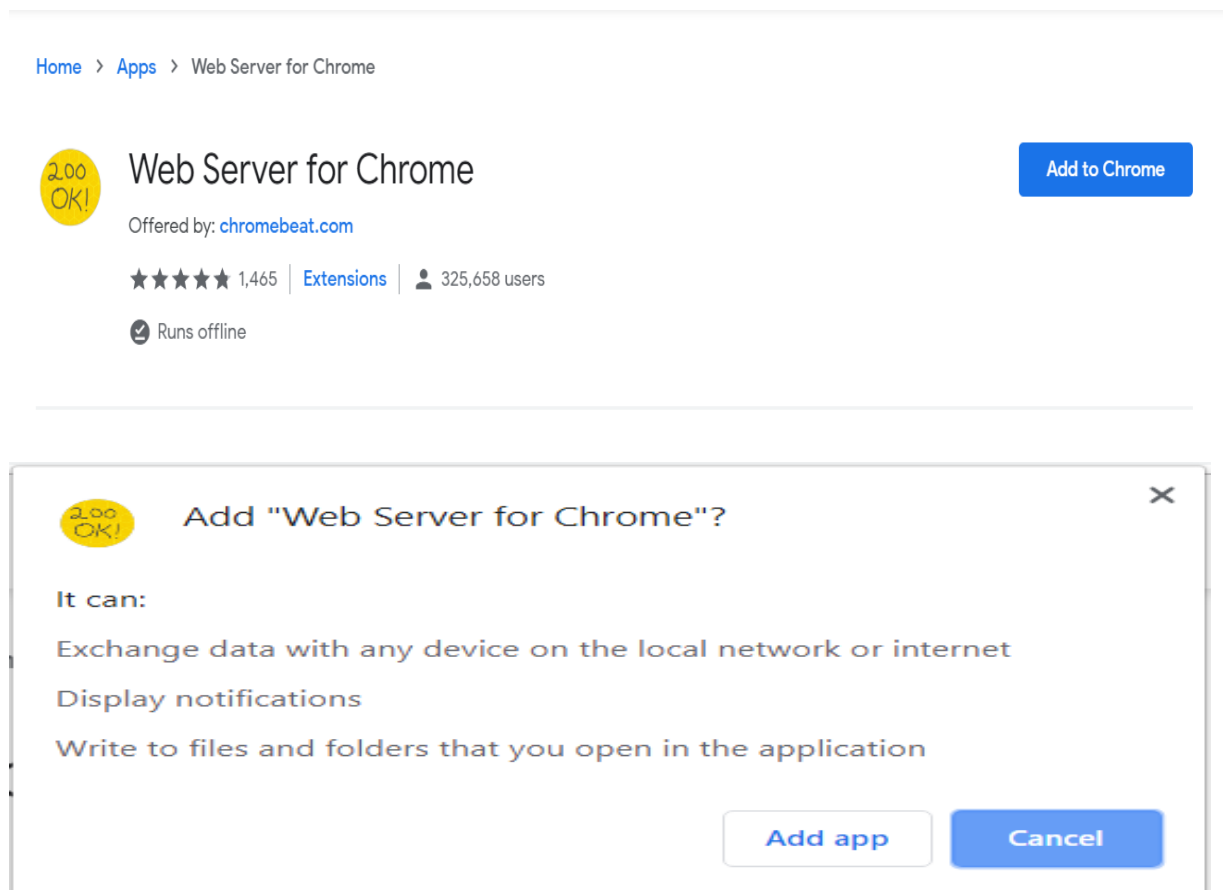


## Appendix B: Automation of case Network graph

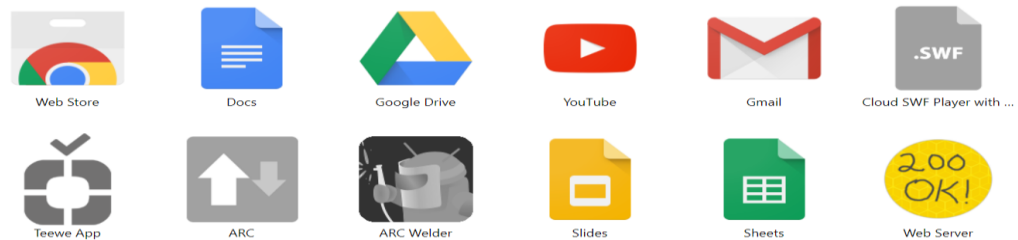
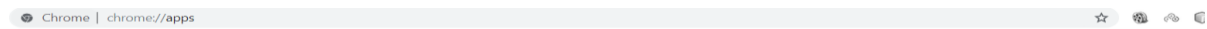
### Technical Implementation

The automation script is written in java and javascript. To depict the relations in the network graph, an embedded neo4j database (noSQL database for graphs) is used. The embedded database allows the automation code to generate the network graph from the csv report files without installing or licensing the neo4j database in the local system. The java code and embedded database can be executed using .exe application which has been generated for user convenience from .jar files. Finally, to view the graph generated a simple light weight http server called the web server for Chrome needs to be installed as an extension. To install the extension follow the below mentioned steps:

- 1) Navigate to <https://chrome.google.com/webstore/detail/web-server-for-chrome/ofhbbkphhbklhfoeikjpcbhmlcggib?hl=en> and select “Add to Chrome” to add the web server to the chrome. It will ask for permission to add the app. Select “Add app”.



- 2) To access the web server, type in the address bar of chrome:- chrome://apps. It will show all the apps currently installed on chrome. Select “Web server” to run it.

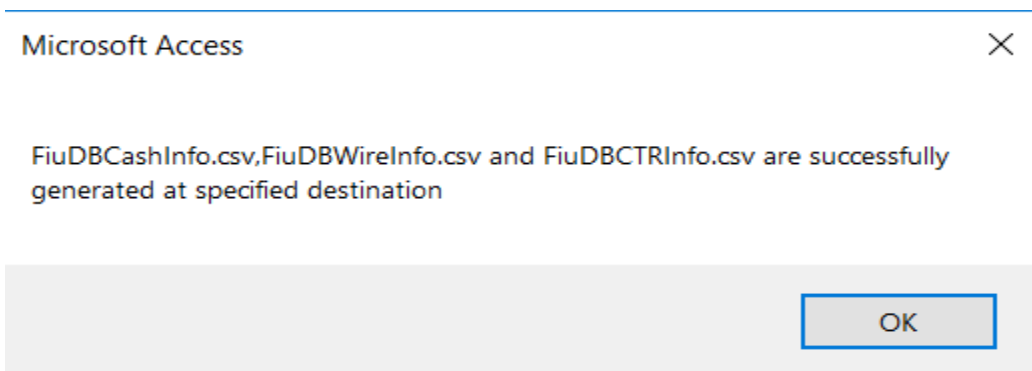
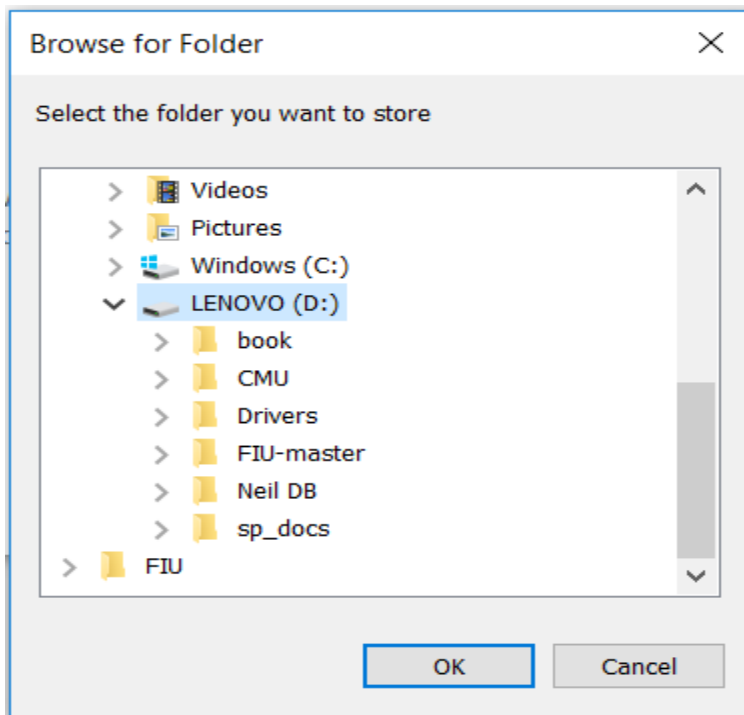


Once the above is installed, the following steps will guide you through the case network graph creation.

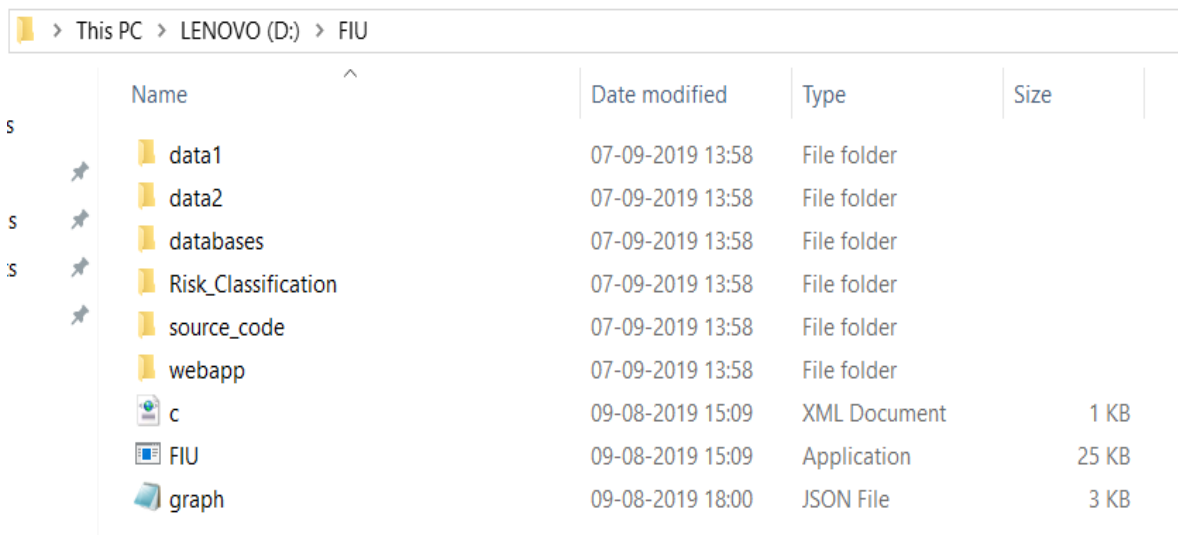
- 1) Open the Access database to generate the case details in csv. To do the same choose the following options Report → Network Graph Generation for Cases. Enter the case id for the case whose graph needs to be generated.

The screenshot shows a web application window titled "Data Visualization Form". Inside the window, the text "FINANCIAL INTELLIGENCE UNIT DATABASE" is displayed in a large, teal, serif font. Below this, there is a label "Case ID" followed by a dropdown menu showing the value "48". A warning message in a smaller, grey font states: "Warning: All the names(First,Middle,Last) must be consistent in both CTR and STR in the CASE". At the bottom of the form, there are two blue buttons with white text: "Export Case Details to CSV" and "Back".

- 2) Click “Export Case Details to CSV”. Choose the folder where you want the files to be saved that are required for the next steps and click “ok”. Three files are generated “FiuDBCashInfo.csv”, “FiuDBWireInfo.csv”, “FiuDBCTRInfo.csv”.

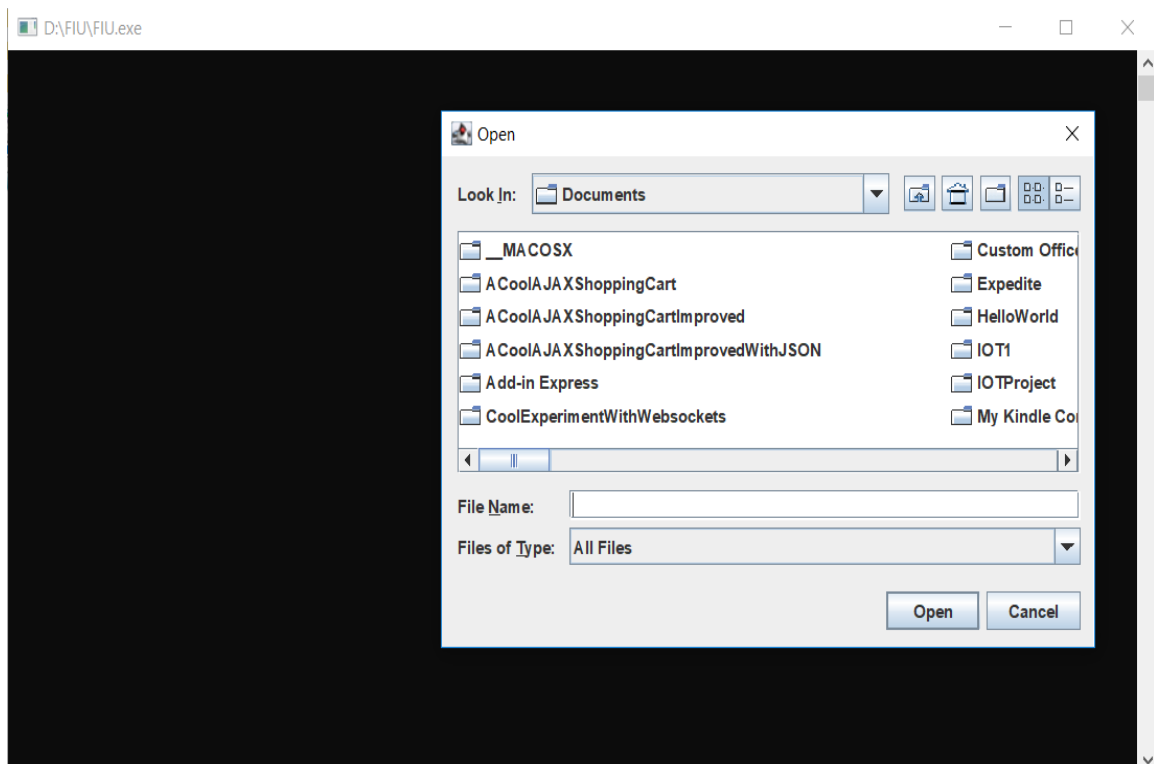


- 3) Navigate to the main Fiu folder.

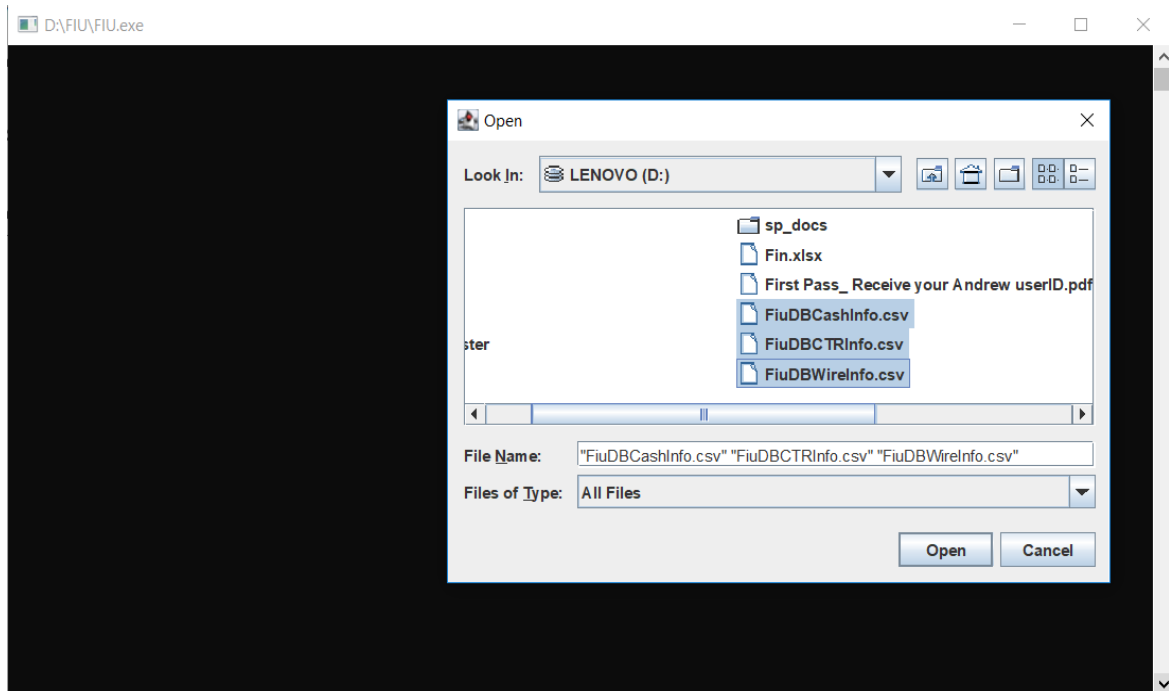


> This PC > LENOVO (D:) > FIU				
	Name	Date modified	Type	Size
	data1	07-09-2019 13:58	File folder	
	data2	07-09-2019 13:58	File folder	
	databases	07-09-2019 13:58	File folder	
	Risk_Classification	07-09-2019 13:58	File folder	
	source_code	07-09-2019 13:58	File folder	
	webapp	07-09-2019 13:58	File folder	
	c	09-08-2019 15:09	XML Document	1 KB
	FIU	09-08-2019 15:09	Application	25 KB
	graph	09-08-2019 18:00	JSON File	3 KB

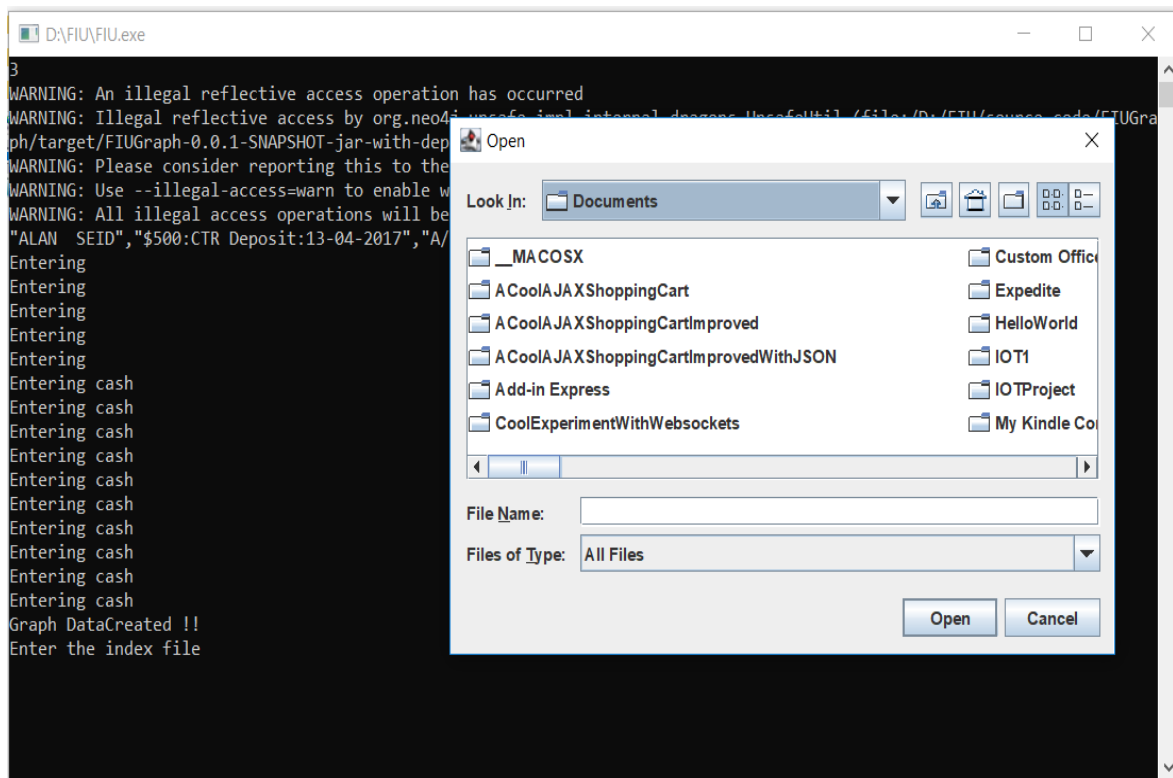
- 4) Start the “FIU” application which would open a black screen and thereafter a file explorer dialog box would open.



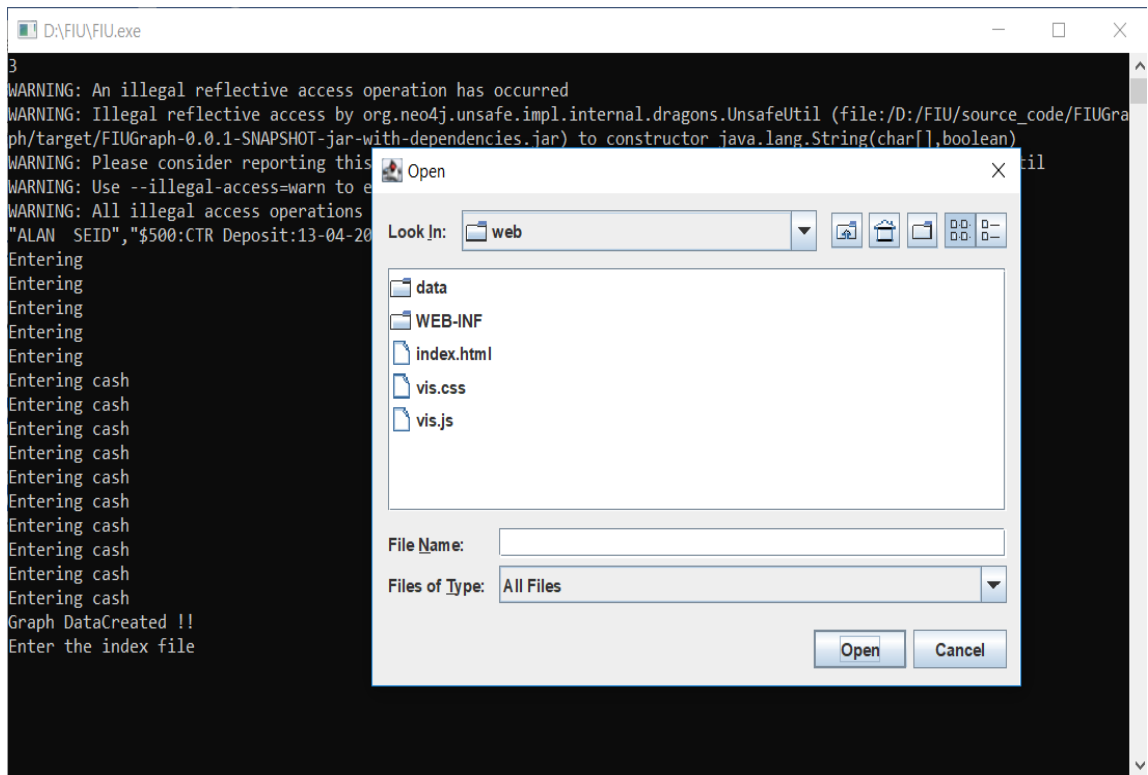
- 5) Navigate to the folder where the 3 files generated from Step 2. Select the three files simultaneously and click open.



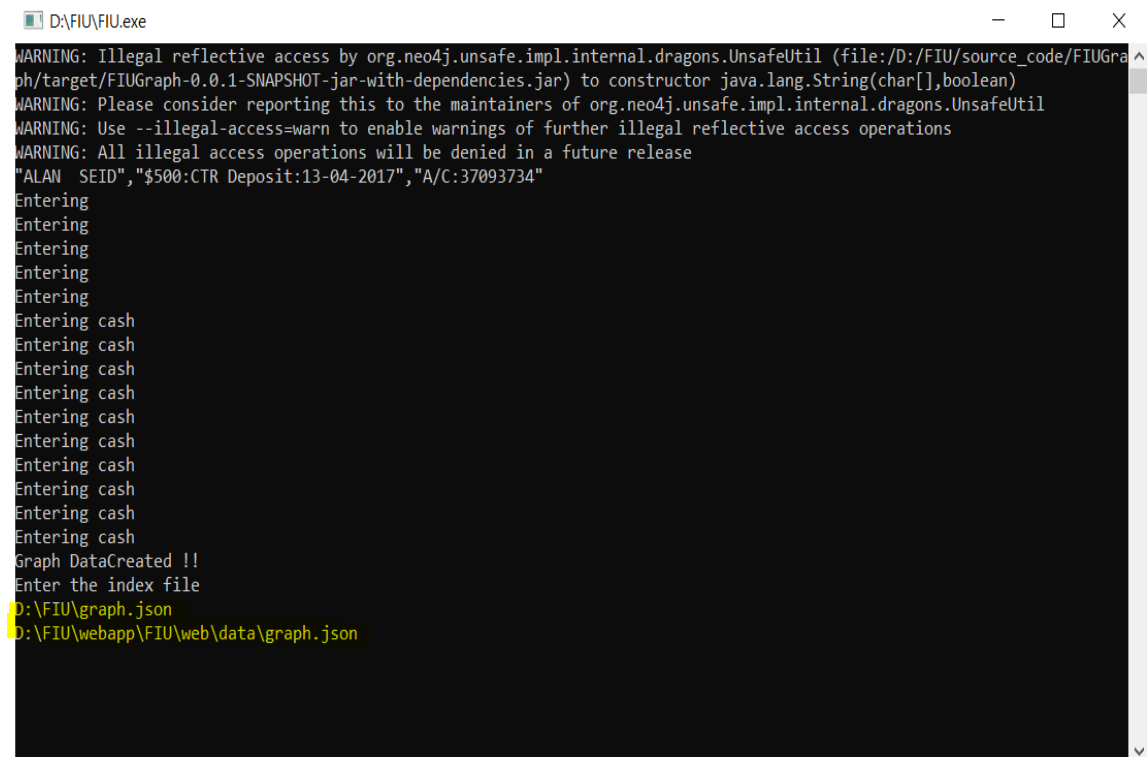
- 6) Next after some processing a new file explorer dialog box opens to enter the index file(text in black screen) .



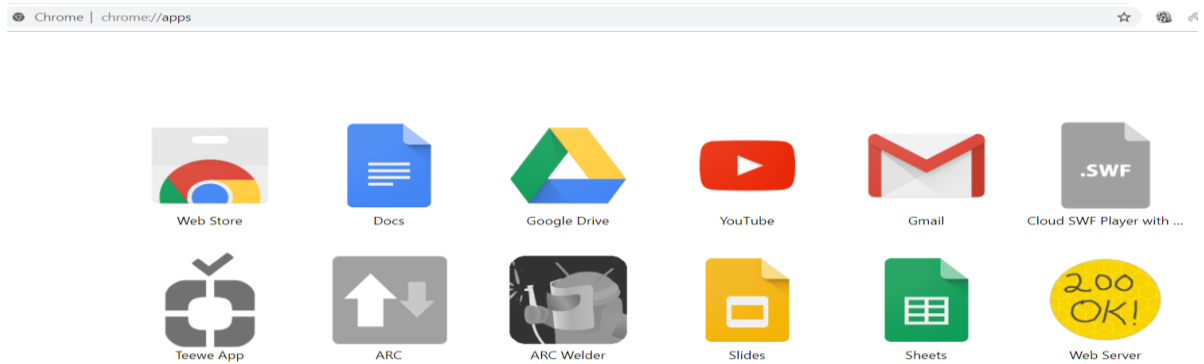
- 7) Through the dialog box, navigate to the main FIU folder. Then navigate through webapp → FIU → web. Select “index.html” and click open.



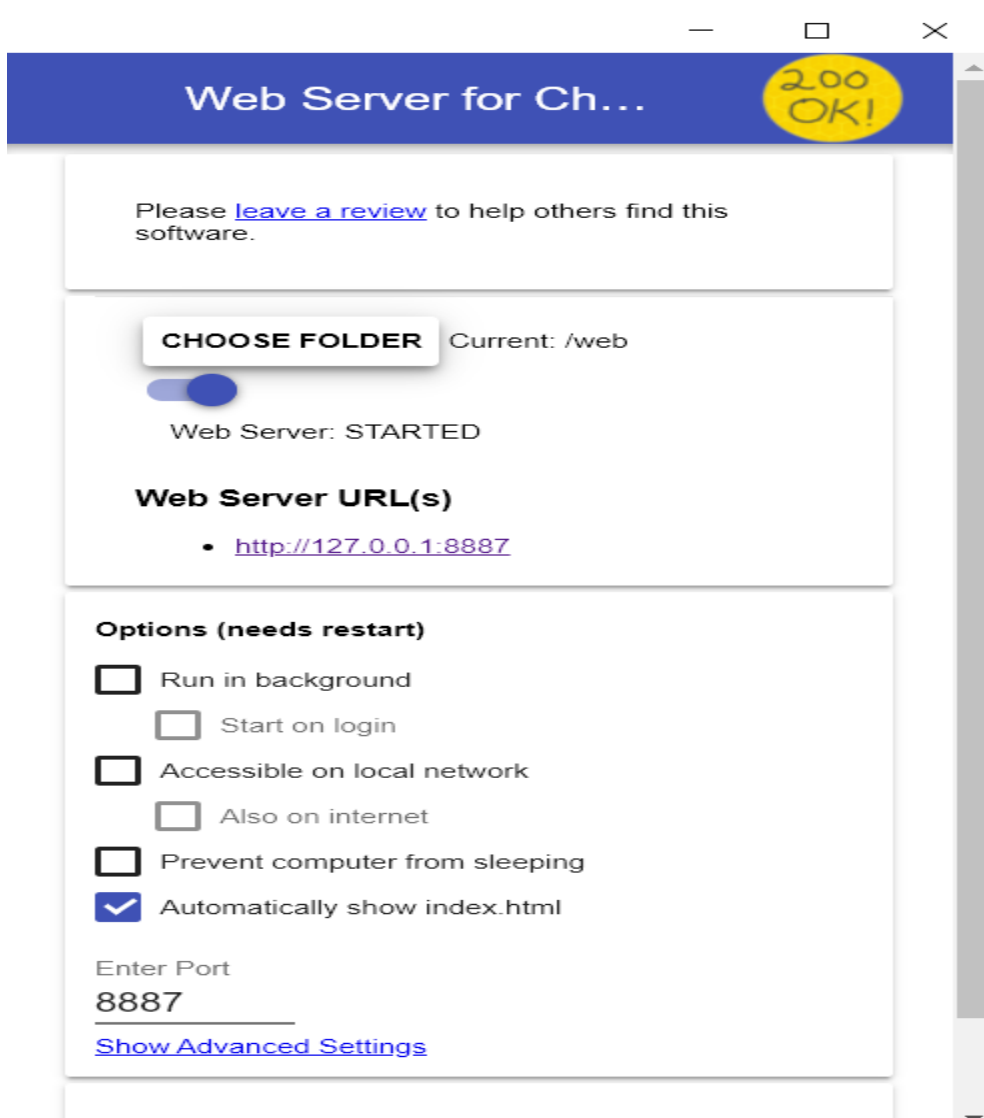
- 8) It will notify that a file graph.json is created.



- 9) Now we need to access the chrome web server we installed on google chrome. Open chrome and type chrome://apps in the address bar and press enter.

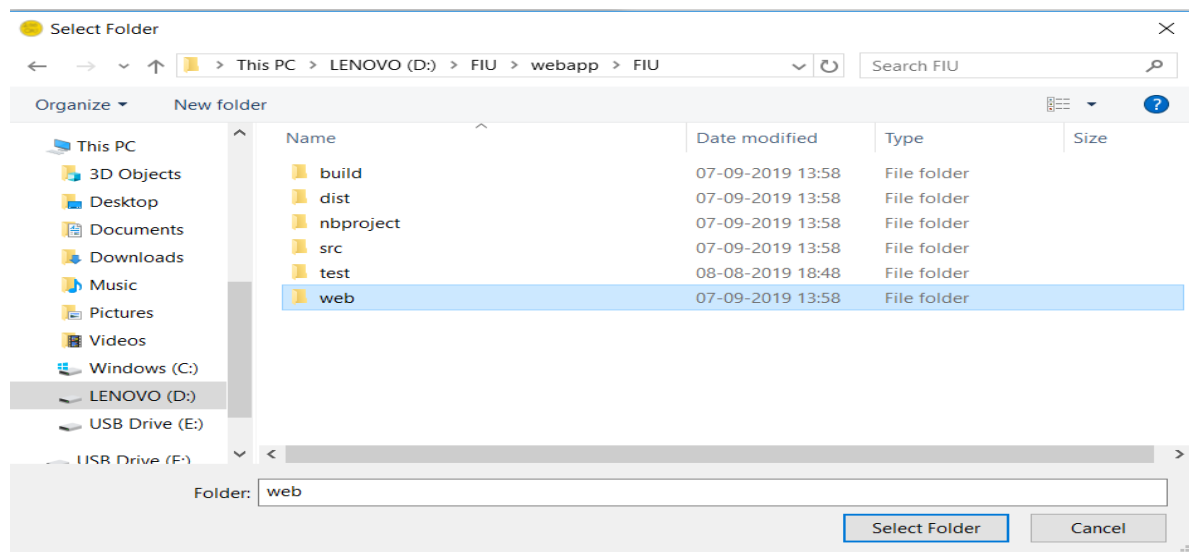


- 10) Click on Web server (icon with 200ok) to open it.





- 11) Click on the choose folder option which would open a file explorer dialog box. Navigate to the main “FIU” folder. Then navigate through webapp→FIU. Next select web and click “Select Folder”.



- 12) After selecting the folder click on the link under “Web Server URL(s)” to generate the graph.



The final graph:

