REPORT
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Investigation of signs of malicious activity through memory and file analysis using RedLine tool

INTRODUCTION

Now a days computer network attacks have become more frequent, it immediately affects legacy and loss for individuals or businesses. The timely response to the situation is the responsibility of the incident response team and lessen the damage. Following the incident, it is used to assess the damage caused, the financial losses, and the lessons learned to prevent similar incidents in the future. The branch of computer forensics employed under similar circumstances is memory forensics, sometimes known as RAM forensics. The Memory is filled with data that can be used to piece together the occurrence. This can be accomplished by employing software to take a image of the compromised device, which is then analysed on the investigator's device using memory forensic software. The investigator's job is to record and analyse the memory image of the compromised system, look for threats and vulnerabilities, and follow the malfunctioning process to determine where the incident originated and report it to the affected organisation or person. The software can record changes made to running processes' registry keys, as well as user activity in event logs and surfing history. In order to provide the necessary results, the investigation must delve deeply into the artefacts and analyse a tremendous amount of data. Memory forensics are also employed by organisations on a regular basis to monitor each employee's log and check for insiders.

Objectives:

The primary objective of investigating the signs of malicious activity through memory and file analysis using Redline tool is to identify and mitigate potential security threats to an organization's computer network.

1. Identifying and analyzing malicious processes running in memory: Redline allows for the creation of memory dumps, which can be analyzed to identify any malicious processes running on a system. By analyzing the memory dumps, it's possible to identify the behavior of the process and determine if it's part of a larger malware infection.

2. Identifying signs of lateral movement: Malware can often move laterally through a network, infecting other systems as it goes. By analyzing memory and file artifacts on multiple systems, it's possible to identify signs of lateral movement and determine how far the infection has spread.

3. Generating reports for further analysis: Redline can generate reports that summarize the results of the analysis. These reports can be used to further investigate potential security threats or to share information with other members of the security team.

Overall, the objective of using Redline tool for memory and file analysis is to detect and mitigate potential security threats to an organization's computer network before they can cause significant damage.

Description:

Investigating the signs of malicious activity through memory and file analysis using Redline tool involves a detailed analysis of the computer system's memory and file artifacts to identify any suspicious behavior or activity that may indicate the presence of malware.

1. Collecting data: Redline tool is used to collect data from the computer system, including memory dumps and file artifacts.

2. Analyzing memory dumps: The memory dumps are analyzed using Redline's memory analysis capabilities to identify any malicious processes running on the system. This analysis can include examining running processes, network connections, and loaded modules to determine if they are part of a larger malware infection.

3. Analyzing file artifacts: Redline can also analyze file artifacts on the system, including executable files, DLLs, and registry keys, to identify any signs of malicious activity. This analysis may include examining file names, file types, digital signatures, and other attributes.

4. Identifying indicators of compromise: Redline can identify indicators of compromise (IOCs) based on the analysis of memory and file artifacts. These IOCs may include IP addresses, domain names, file hashes, and other data points that indicate a system has been compromised.

5. Generating reports: Redline can generate reports that summarize the results of the analysis, including any identified IOCs and suspicious behavior. These reports can be used to further investigate potential security threats or to share information with other members of the security team.

By investigating the signs of malicious activity through memory and file analysis using Redline tool, organizations can detect and mitigate potential security threats to their computer networks, reducing the risk of data breaches and other cybersecurity incidents.

Scope :

Redline is a free memory and file analysis tool developed by FireEye that is designed to help investigators identify and understand the behavior of malicious software on a compromised system. Redline offers a wide range of capabilities for memory and file analysis, and can be used to investigate a variety of signs of malicious activity.

Suspicious network activity: Redline can be used to analyze network traffic captured on a compromised system and identify any suspicious connections or data transfers. This can help investigators identify the IP addresses, domains, or URLs associated with the malicious activity.

Persistence mechanisms: Malicious software often uses persistence mechanisms to ensure that it remains active on a compromised system even after a reboot. Redline can help investigators identify these persistence mechanisms, such as registry keys or scheduled tasks, and understand how they are being used to maintain the malware's presence on the system.

Malicious processes: Redline can be used to analyze running processes on a compromised system and identify any processes that are associated with malicious activity. This can help investigators understand how the malware is operating on the system and what actions it is taking.

File and registry changes: Malicious software often makes changes to files and registry keys on a compromised system. Redline can help investigators identify these changes and understand how they are related to the malware's behavior.

Memory analysis: Redline can be used to perform memory analysis on a compromised system and identify any suspicious processes or code that are running in memory. This can help investigators identify malware that is designed to evade detection by traditional antivirus software.

Overall, Redline provides a powerful set of tools for investigating signs of malicious activity through memory and file analysis. By leveraging the capabilities of Redline, investigators can gain a deeper understanding of the behavior of malware on a compromised system and identify the tools and tactics used by attackers.

Steps involved in investigate the signs of malicious activity Through memory and file analysis using redline tool

Step 1: Firstly we have to goto the fireeye.com website to download and install the redline tool.

Step 2: Extract the downloaded archive the file.

Step 3: Install the extract file.

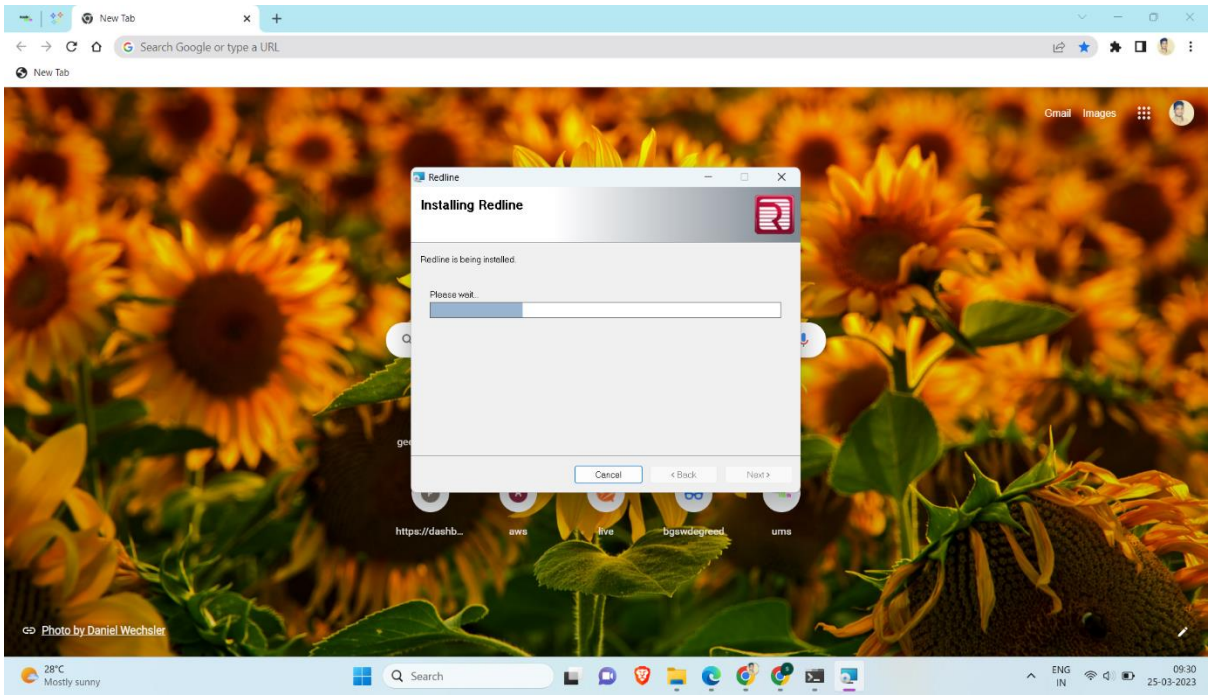

Figure 1: Installation of redline tool

Investigating signs of malicious activity through memory analysis.

Step 4: Once RedLine is launched, click on "Collect" to create a new collection.

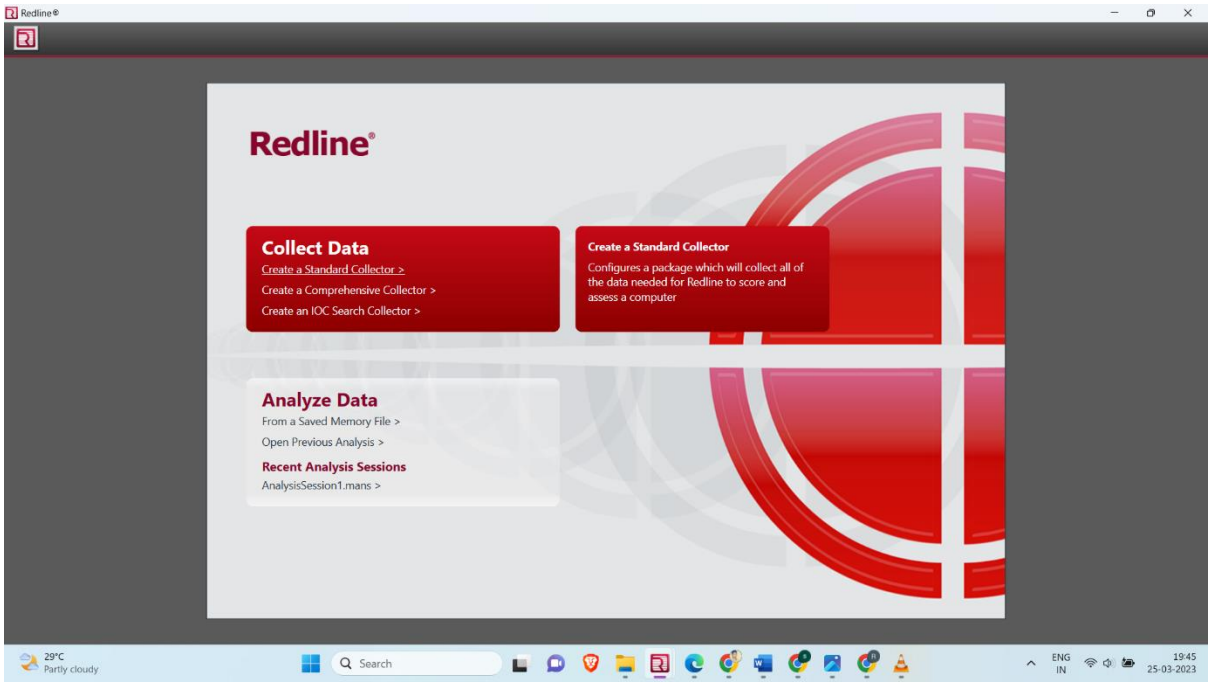

Figure 2: Createing new Collection

Step 5: After the lunching of RedLine tool select the target platform as windows and then select "Memory" as the collection type and then choose the empty folder to store the analysis and remaining reports and then goto the file location. And you can also edit memory , disk , system, network and others as

per your requirements by clicking edit your script.

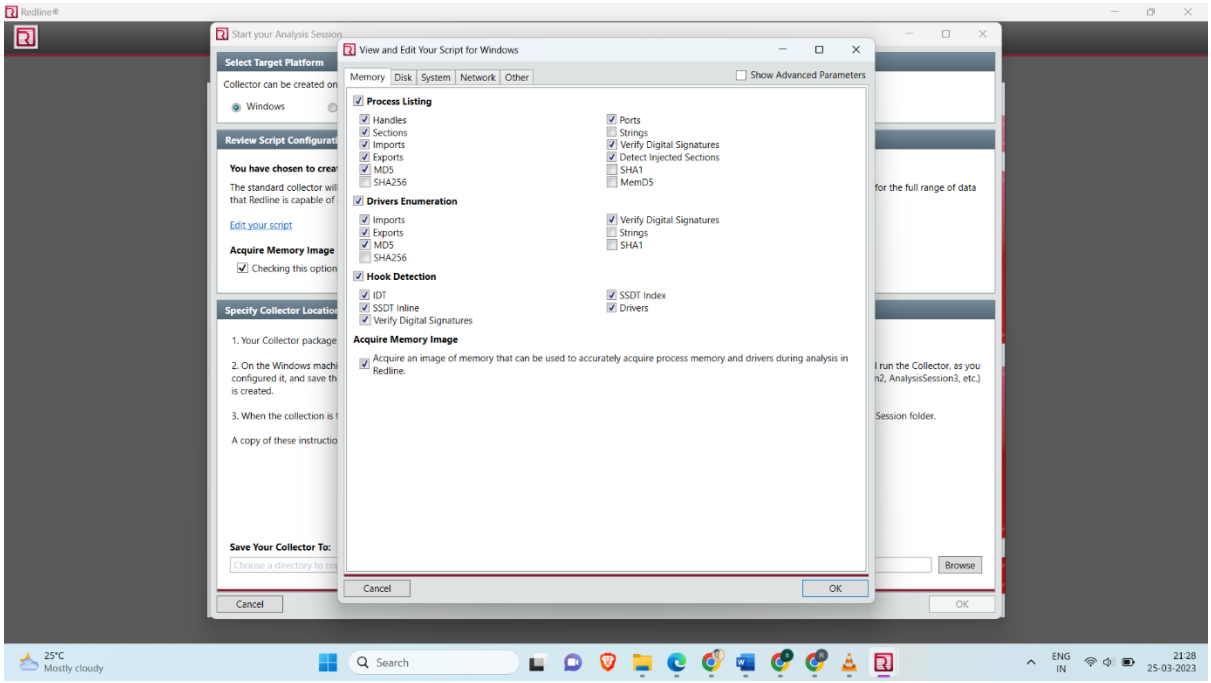

Figure 3: Editing the Script as per requirements

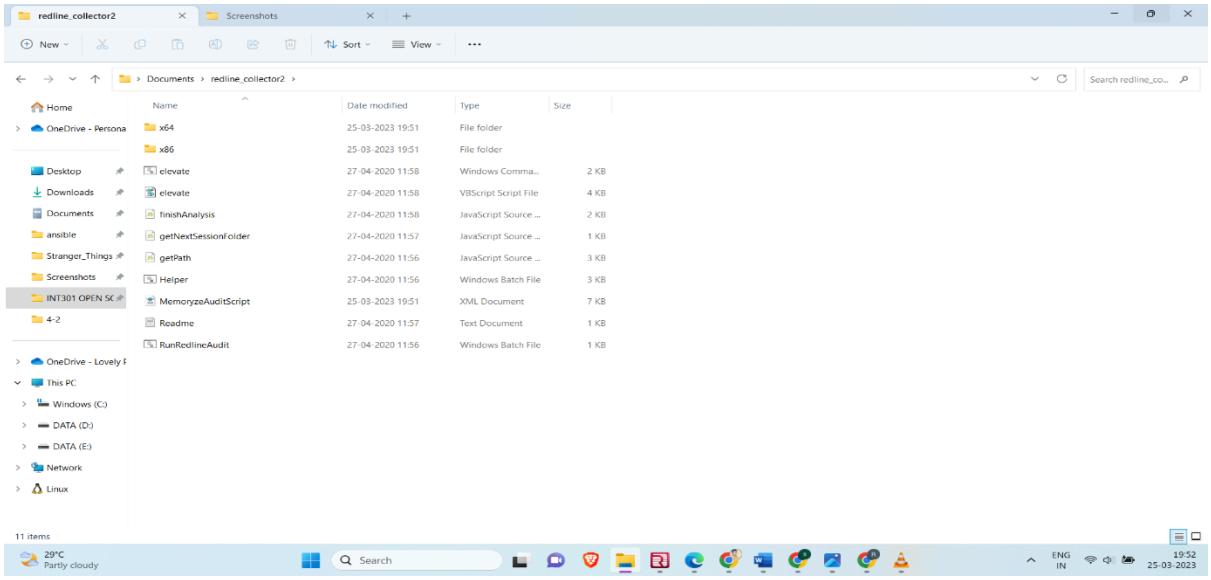

Figure 4: Selecting the RedLineAudit

Step 5: After going to the file location and then double click on the file name called RunRedLineAudit and the it redirect to the command promt.

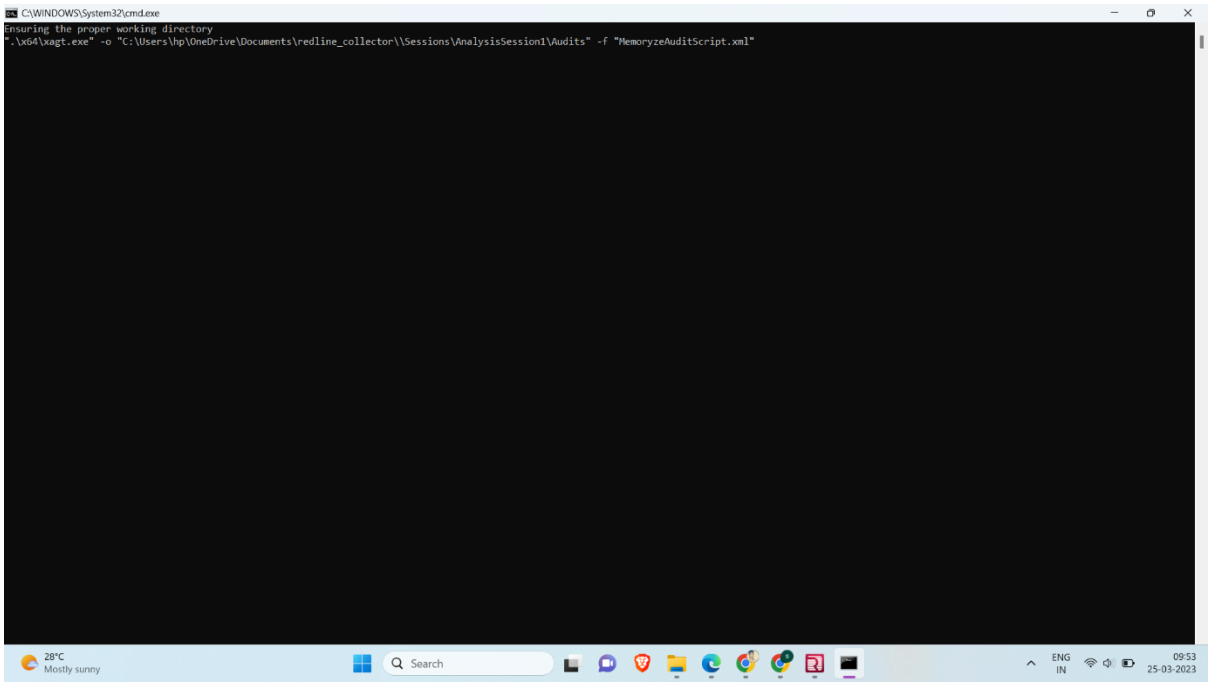

Figure 5: Command Promt opened after running the RedLineAudit

Step 6: After that goto the redline tool and then form Analyze data select the Open previous Analysis and then choose the file called AnalysisSession1 which present the file called Sessions And then it will create and initializing the session.

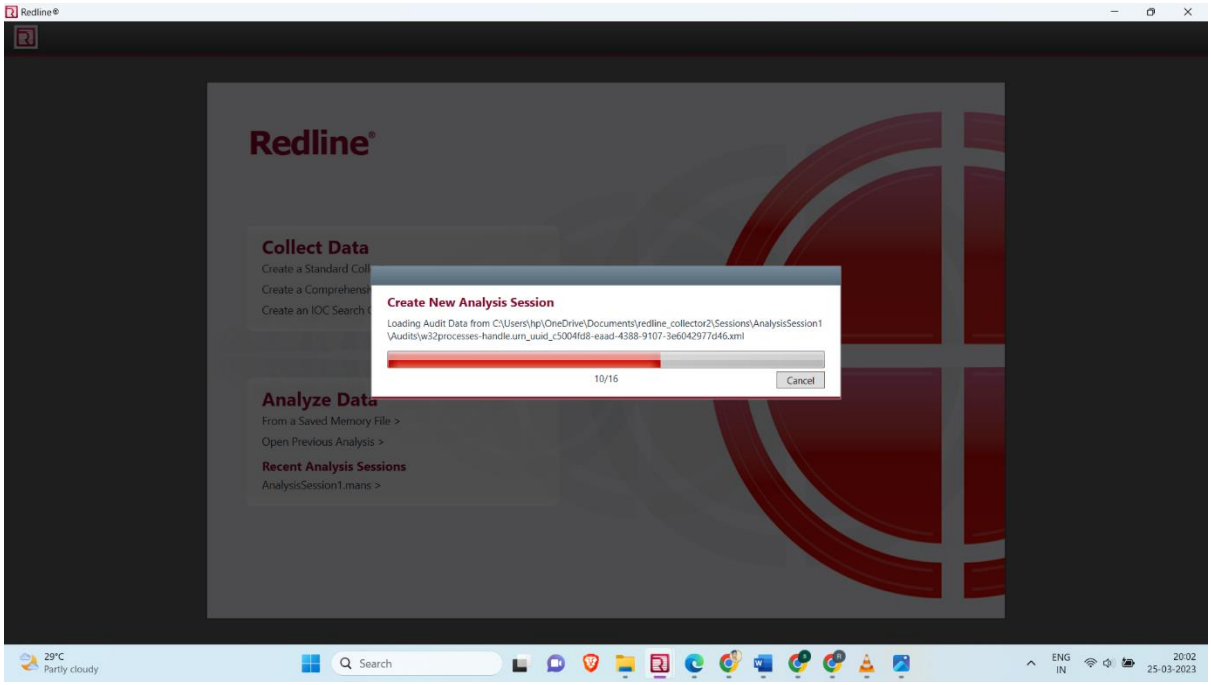

Figure 6: Creating the new analysis session

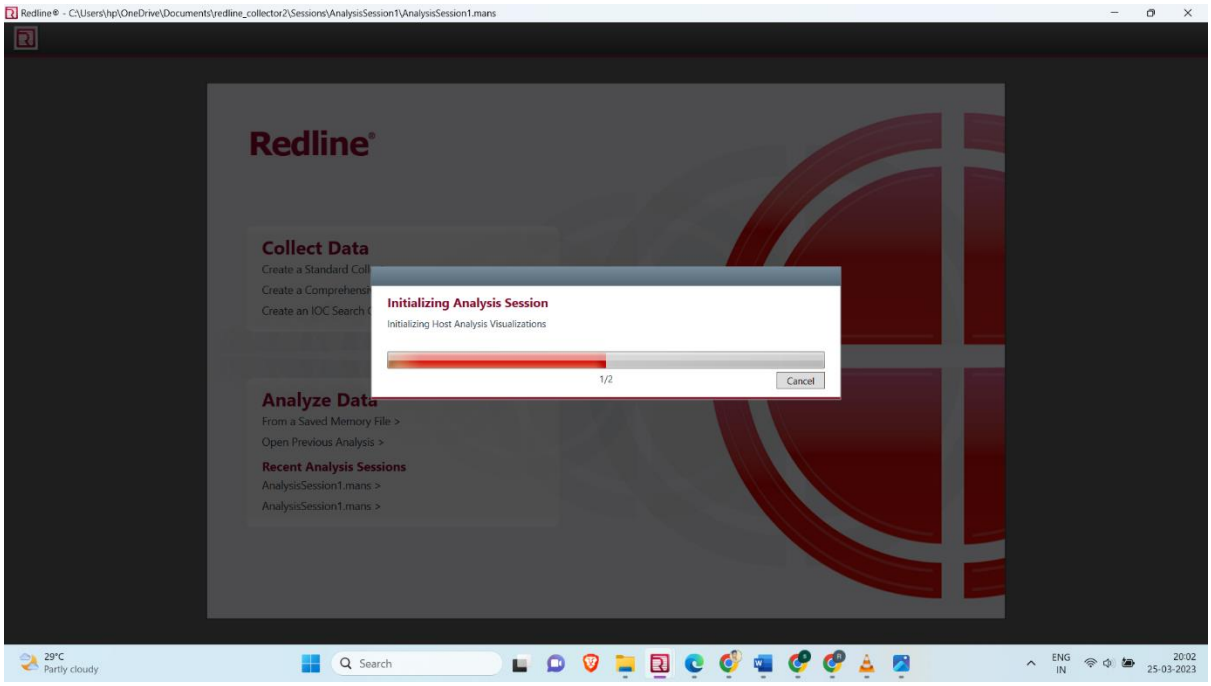

Figure 7: Initializing Analysis Session

Step 7: Then after we will land on the analysis data page here we will find different analysis modules provided by RedLine to investigate the memory for signs of malicious activity.

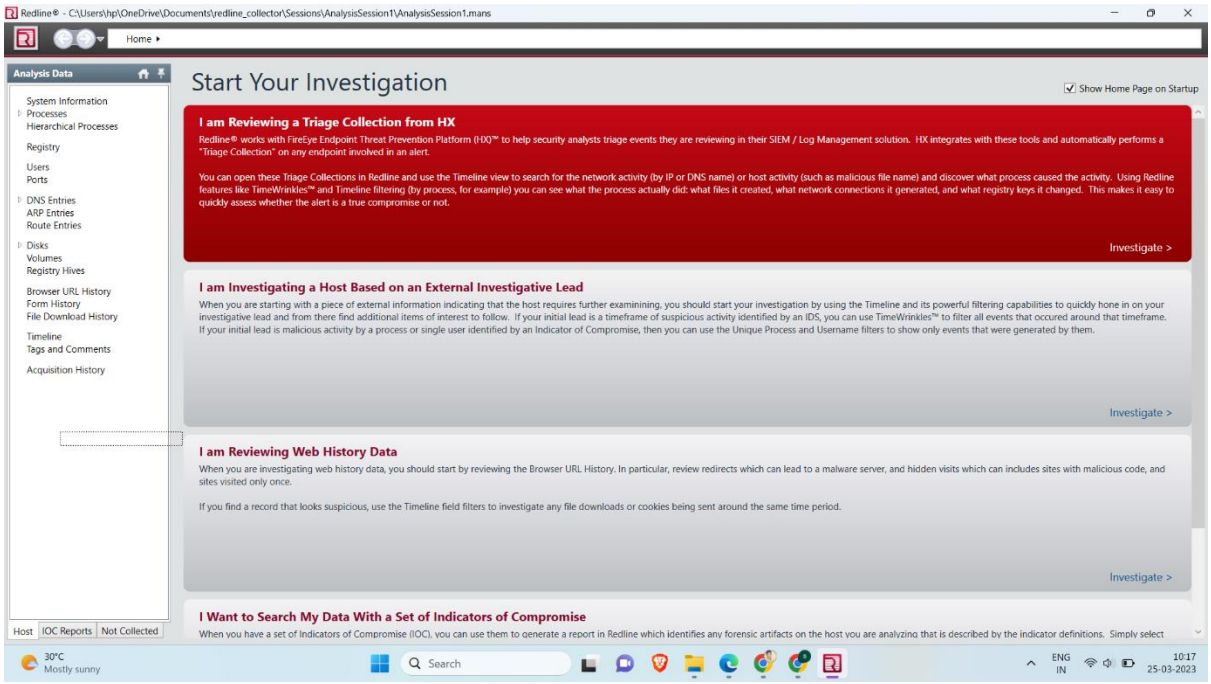

Figure 8: Different types of Navigation modules

Step 8: Here in first module you can investigate the trigger modules. The Triage Summary is a high-level view of the triage data.

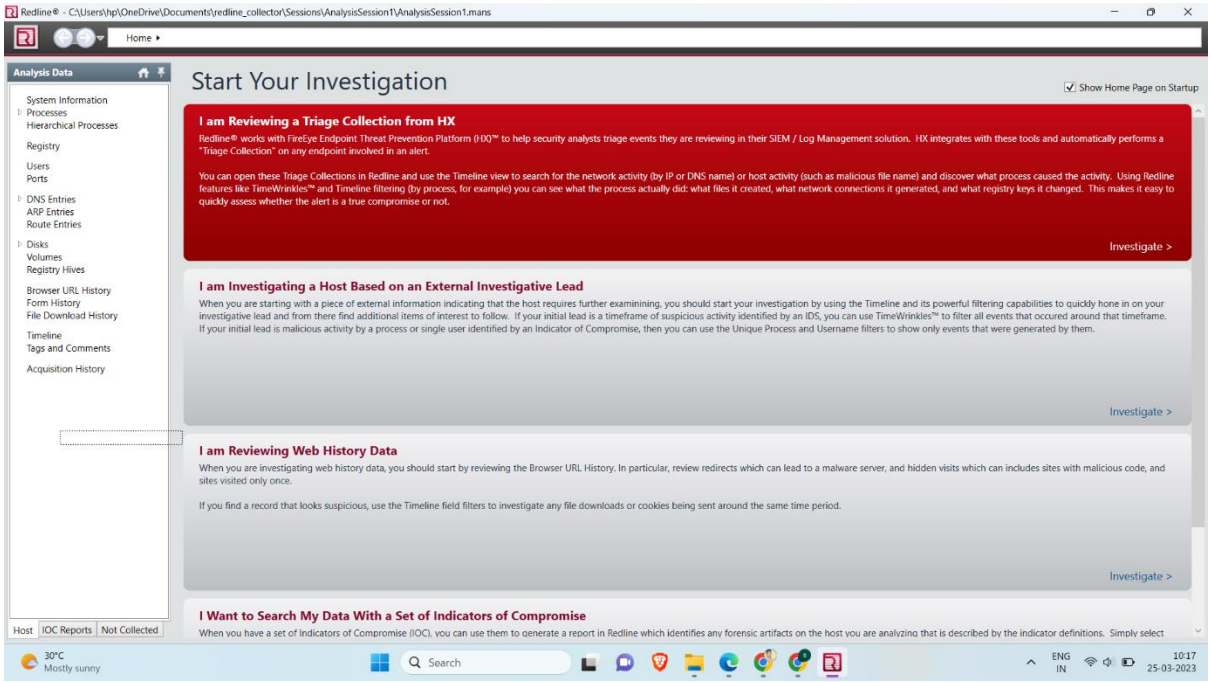

Figure 9: Selecting Triage Collection from HX

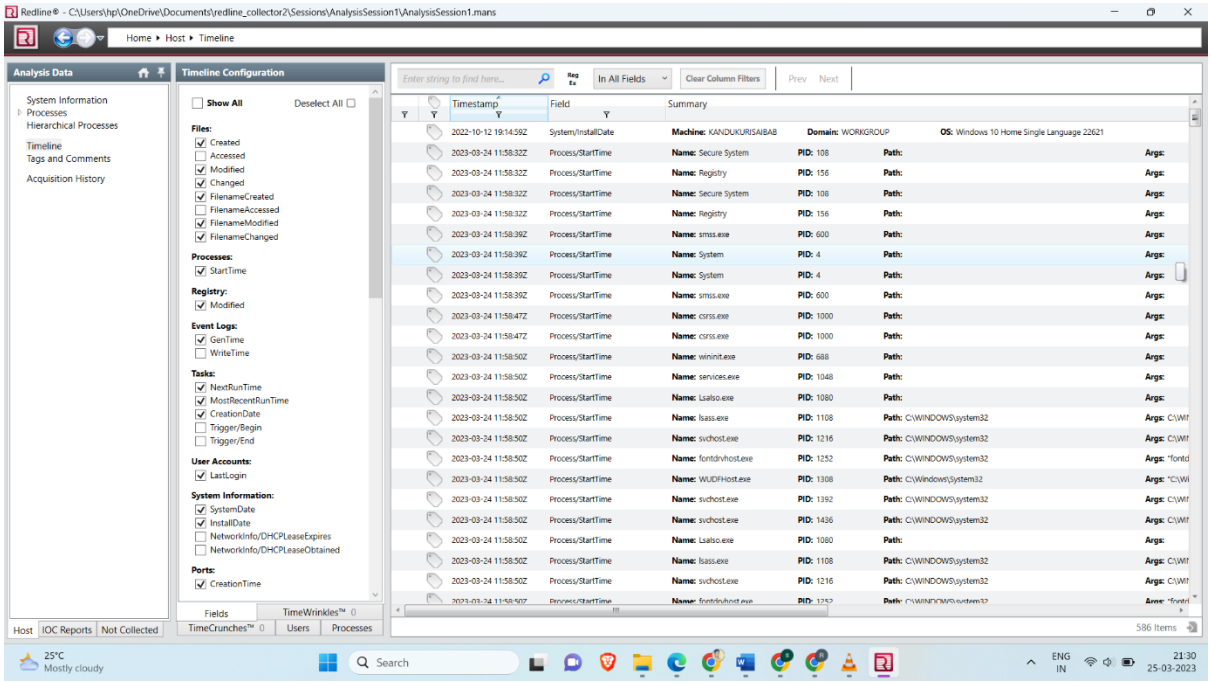

Figure 10: Analysing tab

Step 9: In the same way you can investigate I am Investigating a Host Based on an External Investigative lead here you can here you can investigate host related problems.

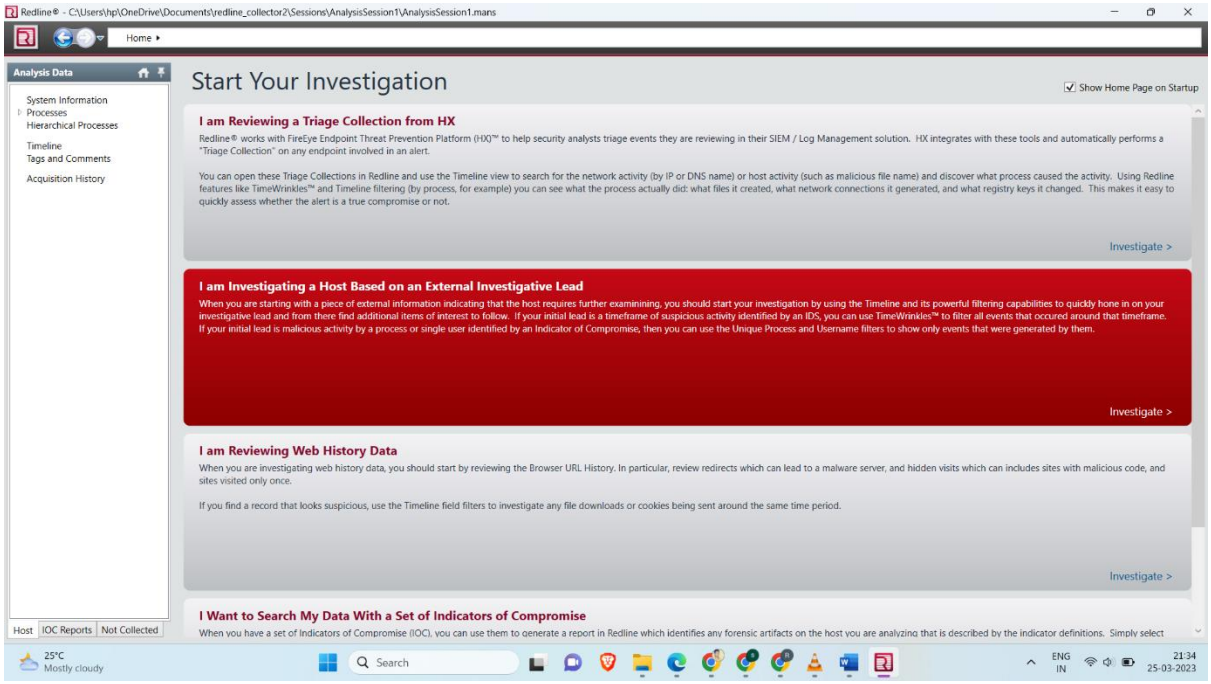

Figure 11: Selecting External Investigative Lead

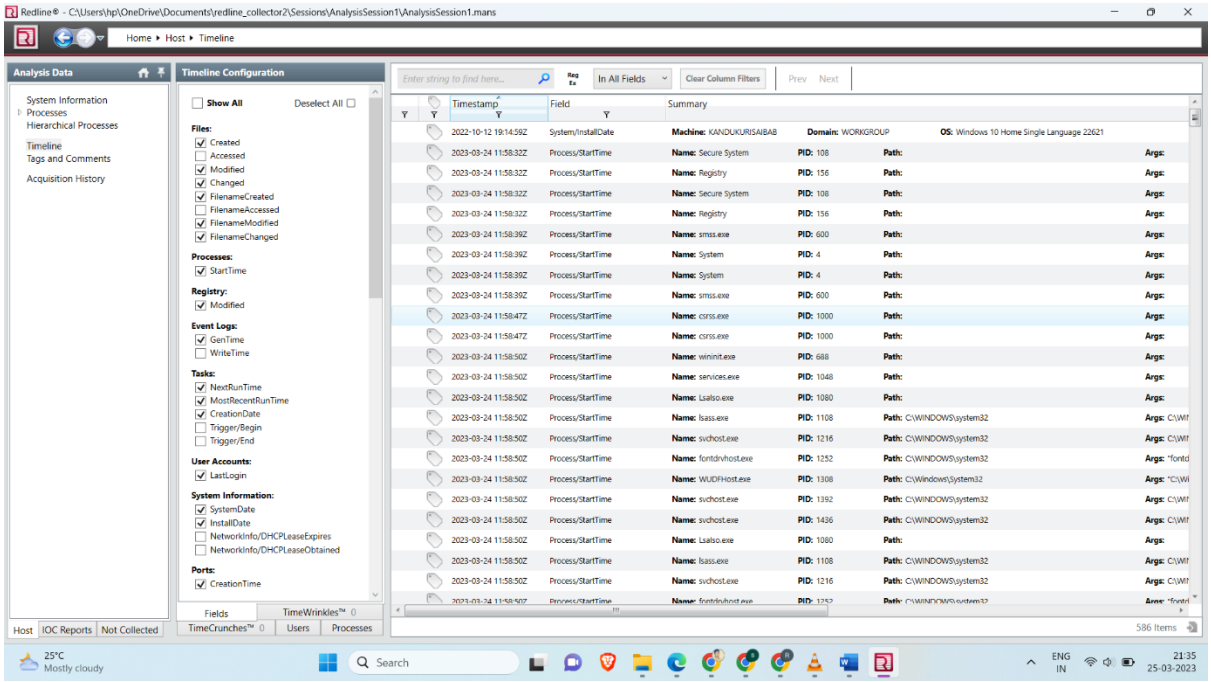

Figure 12: Data analyse tab

Step 10 : In the same way you can investigate I am reviewing web history data in this you can investigate url history and review redirects and many in this.

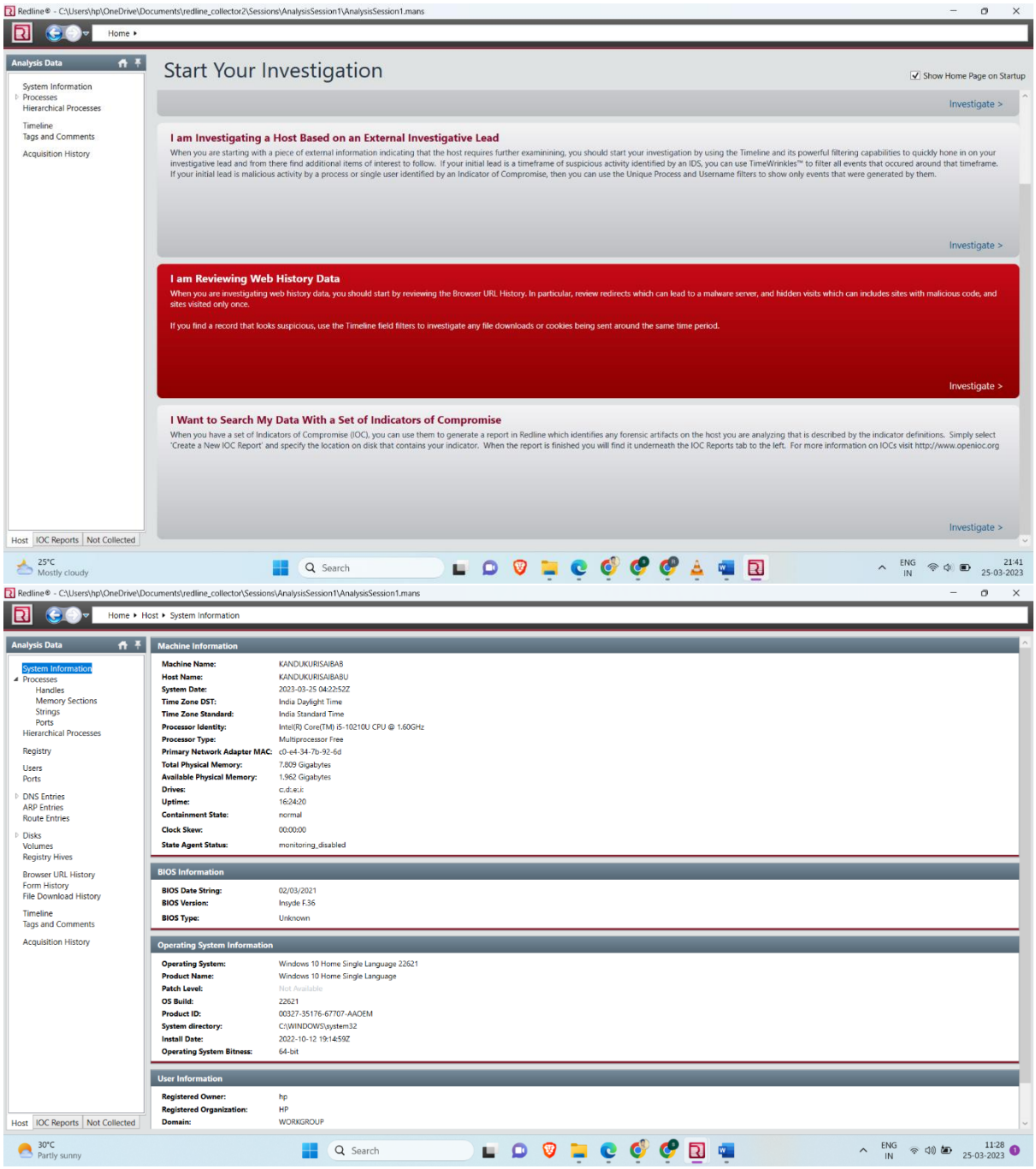

Figure 13: Web History Analysis

Investigating signs of malicious activity through file analysis

Step 11: Open the redline tool in main tab you can see analyze data and then click on the from a saved memory file.

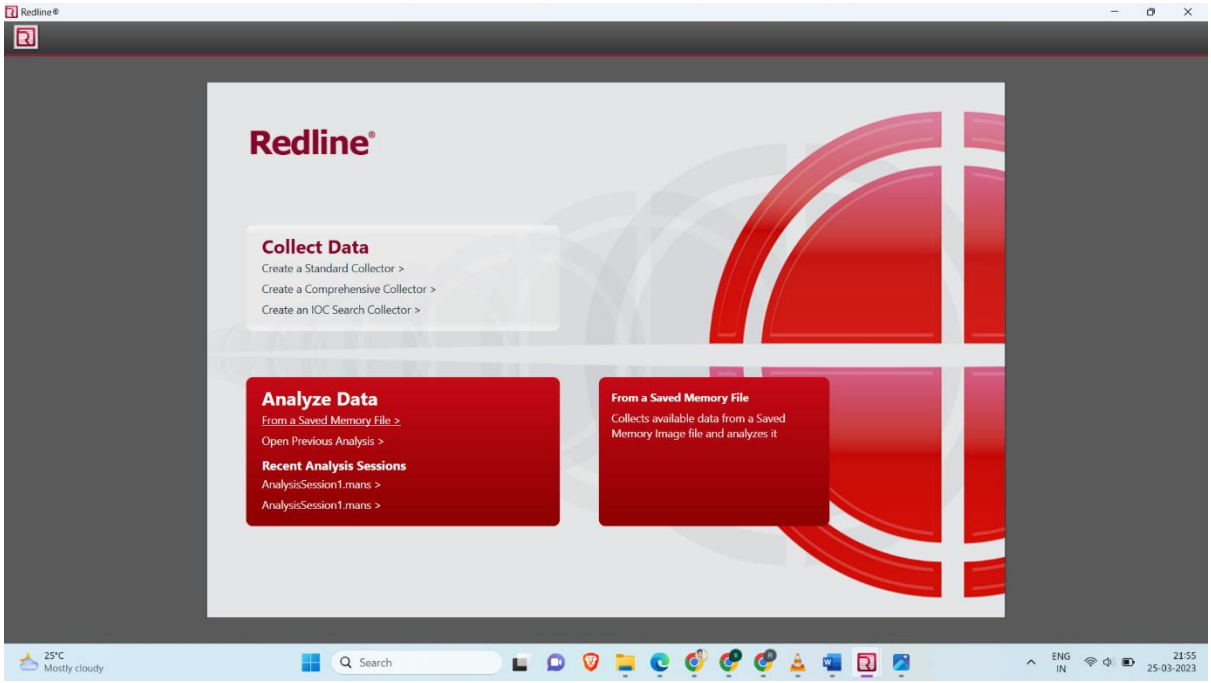

Figure 14: Selecting the analyse tab

Step 12 : After that select the folder where image present and then click on Next and you can also edit your script .

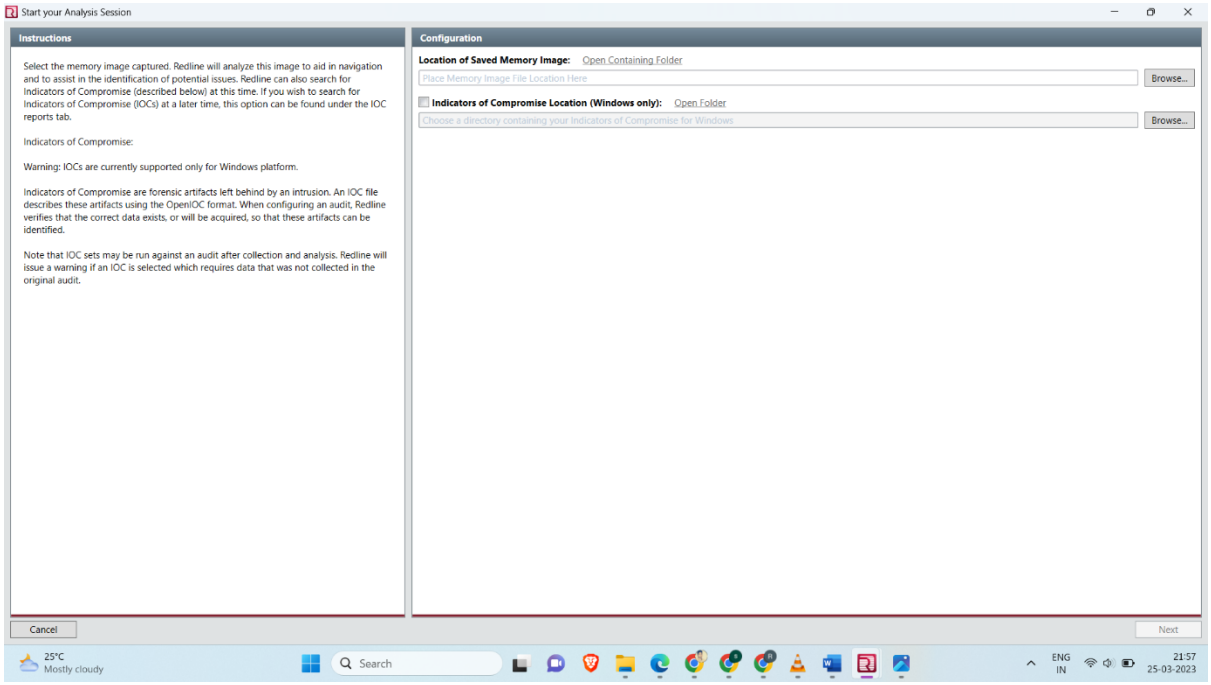

Figure 15: Editing the Script

Step 13 : After that it will analyze and then initialize.

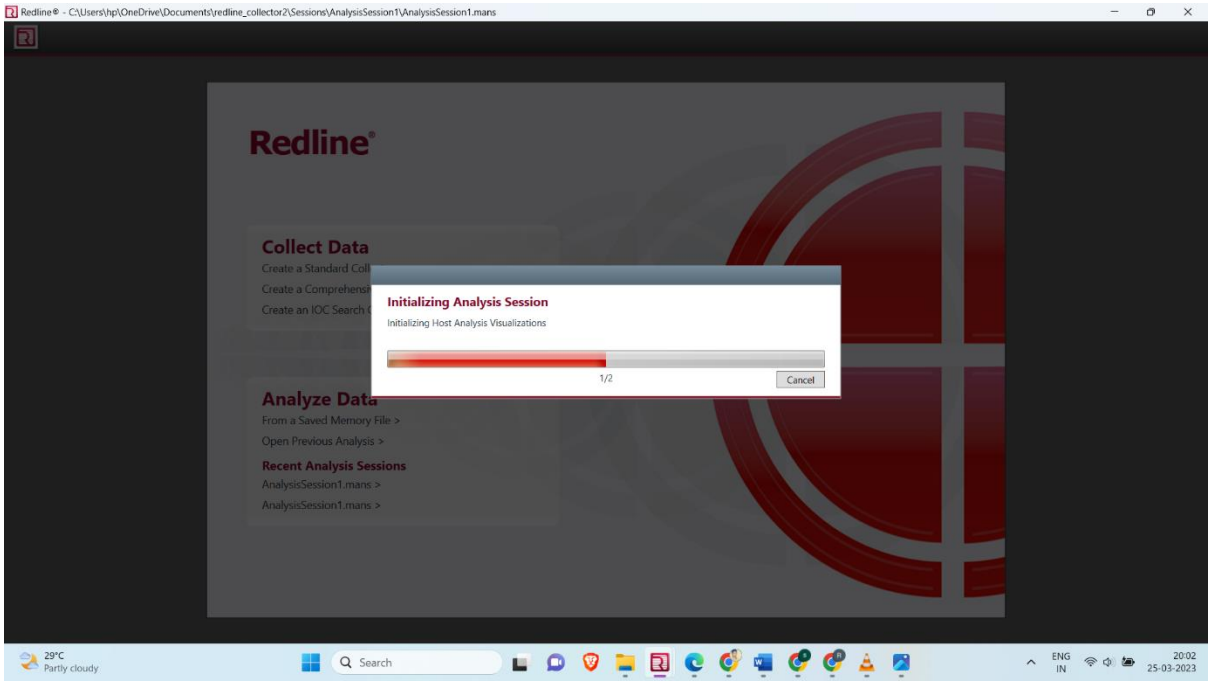

Figure 16: Initializing analysis session

Step 14 : In the same way like memory analysis we Use the different analysis modules provided by RedLine to investigate the file for signs of malicious activity. For example, you can use the "Strings" module to search for known malicious strings in the file or the "PE Headers" module to view information about the file's binary structure.

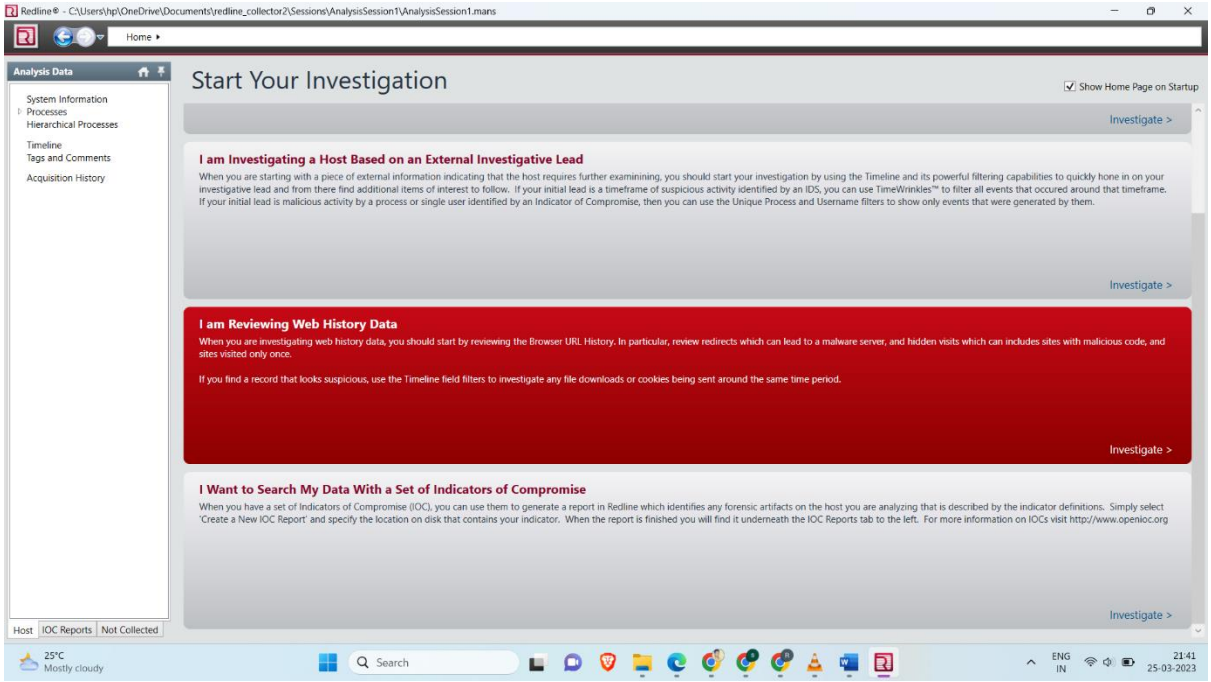

Figure 17: Web History Data

Here we can analyse using different modules which is same as memory analysis.

Conclusion: Investigating the signs of malicious activity through memory and file analysis using Redline tool can provide valuable insights into potential security breaches and help identify the source of the attack. Redline tool is a powerful tool that enables the analysis of system memory and file artifacts to detect and investigate malicious activity. By analyzing the system's memory and file artifacts, Redline can identify suspicious processes, network connections, registry modifications, and other indicators of compromise. Redline tool can be an effective tool for investigating signs of malicious activity through memory and file analysis, and can help organizations improve their overall security posture by identifying and mitigating potential threats.

References:

FireEye Redline User Guide:
https://fireeye.market/assets/apps/211364/documents/877936_en.pdf

ScienceDirect:

https://www.sciencedirect.com/topics/computer-science/memory-forensics