Greater Omorose(

Section 1

Introduction

The investigation aims to gather evidence related to the armed robbery at West Monkseaton Post Office on 30th November 2016 to identify those responsible, their motivation, and plan.

Background information:

On the 30th of November, there was an armed robbery at West Monkseaton Post Office. Witnesses saw two individuals fleeing in a black car with the license plate NY54 KSO. After gaining photographic evidence of the car, police were led to Mr. Alan Redmond who was the last known owner of the car. Mr Redmond provided the details of the individuals who purchased the vehicle, leading to the identification of Mr. Lewis Scott, Mr. Carl Brown, and Mr. Eddie Young.

Scope and Limitations

Our investigation will focus on examining Mr. Scott's iPhone 4s, and his computer. I will analyse text messages, calls, images, videos, files, and web history.

The possible limitations in this investigation are:

- Difficulty in reconstructing deleted files, especially if secure deletion methods or special software were used.
- The forensic analysis must adhere to legal requirements and ethical standards, this may restrict the methods and extent of the examination, particularly regarding privacy concerns and the handling of sensitive or privileged information.
- The suspect might have used encryption software to hide his activity.
- Not all incriminated devices used by the suspects might have been collected by the police.
- The suspects were not captured immediately after the robbery, so they probably had enough time to conceal or destroy evidence.

Methodology

For this investigation I used Autopsy version 4.20.0, which is a digital forensics tool. I used Autopsy because its key functionalities such as metadata extraction, file analysis, keyword search, artifact analysis, and hash analysis allow investigators to find, document, and present findings in the juridical process. These functionalities enabled me to efficiently identify relevant evidence, and reconstruct the sequence of events leading up to the robbery.

During the investigation, I tagged evidence related to the robbery and examined internet history and search queries to uncover online research conducted by the suspect.

The logical phone extraction method recovered deleted files from Mr. Scott's iPhone 4s, revealing insights into his communications with accomplices.

Findings

The hard disk model is ST380215AS ATA, with Windows 7 Enterprise Service Pack 1 installed on 2016/10/4 at 10:44. The primary user accounts are "Student" and "Lewis Scott". Additionally, the system time zone is GMT, with a standard time bias of BST. Furthermore, I discovered that an iPhone 4s was connected to the computer on 2016-11-22 and this matches the phone model that has been confiscated by the police. The user account named Lewis Scott and the connection to the iPhone 4s and the time zone GMT, which suggests that it was likely used in the UK, suggests Lewis Scott's awareness of the computer's existence. Moreover, a M3 Portable

Hard Drive 1TB was connected on December 5th, 2016, potentially containing valuable evidence yet to be confiscated by the police.

Files

During the forensic investigation, it was discovered that Tor Browser, an anonymizing browser, was installed and accessed on Lewis Scott's computer on 2016-10-19 at 16:55:27. His familiarity with the software is evident from a custom jump list on Tor browser, indicating that he manually pinned the file to the start menu. Additionally, his search history includes queries about Tor browser and its benefits, demonstrating at least a basic understanding of the software's functions.

This use of Tor Browser can be indicative of Lewis Scott's attempts to conceal his online research, communications, or other activities related to the planning or execution of the robbery. It raises questions about what specific activities he was trying to hide and emphasizes the significance of further investigation into encrypted or hidden data and communications.

According to the report brief, a suspicious individual was caught on the CCTV while they were taking photos of the post office, and during my investigation on the computer, I found suspicious photos of the post office (interior and exterior including CCTV location) taken on 2016-11-21. This post office matched the location of the robbery, so this indicates that there was premeditation by Mr. Scott. He later then accessed these pictures; this is evident from the thumb caches found on his computer.

In the recycle bin, I recovered a PNG file and a password-protected docx file named "Master Plan". The PNG contained the image of a car listed for 1,650 pounds. Mr. Scott knew this file's existence because he attempted to delete them, furthermore, I was able to find the thumb cache of this PNG as well which confirms that he opened these images. Mr. Scott had knowledge of the Master Plan.docx this is evident from the automatic jump list found, he also intentionally locked the document with a password. I know that he intentionally locked it because, in his browsing history, I found searches (2016-10-11) on 'ways to password protect a document on Word'.

While examining the phone image I discovered a note(figure 24) containing the password for the master plan.docx:'LewisMasterPlan 2580'. He knew about the password because he searched for ways to encrypt notes(figure 26)

Upon accessing Master plan.docx, I found out a lot:

- Firstly, it mentioned that the gateway vehicle was a BMW 7 series 740i e38 located in Queensbury BD13 in Bradford. This matches the description of the car found in the recycle bin and the black estate car captured on camera.
- Secondly, it mentions about buying fake number plates online. By checking the cookies and web history I found visits to numbe1plates.com, Demonplates.com, Proplates.co.uk, and Platecreator.com on 2016-11-02.
- Thirdly, the document said that they were targeting West Monkseaton Post Office and there were pictures from Google Maps showing its area. This is the same post office that got robbed on 30/11/2016.
- I found web links of equipment that could be linked to the robbery like a 3-hole balaclava, curved claw hammer, handguns, and a duffle bag. Lewis Scott knew about these because they were in his web history. This web links were also in a document called Gear.docx. Lewis Scott accessed Gear.docx because I found an automatic jump list.
- Lastly, it had a code to open the safe, and a map showing the post office layout, e.g. CCTV location etch. The document mentioned that the robbery was going to happen on 30/11/2016. Since the last time that Master plan.docx was opened was on 2016-11-25,

and the robbery date matches the actual robbery date, these show signs of premeditation by Lewis Scott.

In a folder labeled 'Possible cars' there are 4 images taken from Google Maps showing Low Lane Bradford BD13, Queensbury. If this matches Mr. Alan Redmon's address, then it could suggest that Lewis Scott engaged in the purchase of the black estate vehicle. Lewis Scott accessed the 'Possible Cars' folder because there is an automatic jump list to this folder and I also found thumb caches of the images in the folder. Within the 'possible cars' folder, I found another folder named 'get rid of car loc' that contains images that suggest plans to dispose of the car. Lewis Scott knew about this file because there is an automatic jump list that was created, and I found thumb caches of the pictures that are within this. Police can investigate these locations for the getaway car.

I found another document named 'Potential Location.docx' that shows post offices in Newcastle, Gateshead, and Whitley Bay including the West Monkseaton Post Office. Lewis Scott knew about this file because there is an automatic jump list to this docx file. There is another file called Doc1.docx that displays a loan screenshot from paydayluk.co.uk for £600. If the loan was signed by Lewis Scott, this could help police investigations because the Master Plan mentions taking a loan for the car.

Lastly, 'presentation1.pptx' contains a hate message towards Royal Mail. The presentation had a Royal Mail logo and a bin which were separated by the sentence 'Should be,' altogether this should mean 'Royal Mail should be binned/trashed'. Lewis Scott knew about presentation 1.pptx because there is an automatic jump list that was created for this file and all the pictures I found in this file, are in the thumb cache as well.

In other findings, I discovered images of a machete on knifecentre.com and another image showing a total price of £35.94 for the machete. Additionally, I then found a video in which someone is recording himself burning the Royal Mail Logo while crying. The setting appears to be a garage, possibly belonging to Lewis Scott or his accomplice, as voices can be heard in the background, indicating at least two individuals present. Lewis Scott knew of this file because I found them in the thumb cache.

I found out that Lewis was looking for jobs, CV templates, ways to make money fast illegally, and articles on shop robbery. These searches show his desire to make quick money. Lastly, he searched for 'People who hate Royal Mail' and other hate content towards Royal Mail.

In the phone investigation, I found that Lewis Scott's phone number is +447564251570, along with Google searches regarding post offices in Newcastle, Whitley Bay, and South Shield on 17/11/2016(figure25). I found search queries on machete, 'sacked from work getting them back', 'how to make money fast illegally', and 'Unfair dismissal'(figure22,23).

Contacts for Eddie Young and Carl Brown were also recovered, with Lewis saving Eddie Young's number as 'Youngy' and Carl Brown's as 'Carl' and their phone number are +447939968834 and +447564251569 respectively(figure3). Furthermore, Mr. Scott is friend with Mr. Brown and Carl on Facebook messager(figure1)(figure2). These informations imply that Lewis Scott knew about Mr. Young and Brown.

On 08/11/2016, I found out that 'Youngy' sent a message containing web links(figure4) to equipment which are the same as the web links I found in Gear.docx.

There was a group chat on Viber in which the participants were Mr Scott, Young, and Brown(figure3). This group chat gave me valuable information, for example in a message on 11/11/2016 'Youngy' called Lewis Scott the leader of their plans, with Carl saying he would join as long as he didn't get caught(figure5). Then, on 17/11/2016, they discussed future plans, and Lewis hinted they might attract police attention(figure6), suggesting they were up to no good. On

22/11/2016 'Youngy' mentioned 'Ami', confirming her involvement in the robbery(figure7) and giving them inside info, like floor plans and codes(figure8)(figure10). Facebook chats on 23/11/2016 showed that Lewis and Ami were romantically involved (figure 9), and Ami admitted to helping Lewis and his friends(figure8). Furthermore, on 30/11/2016 there was a chat in which Ami confessed to leaving the exit door intentionally open on the day of the robbery for MR Scott and his accomplices(figure9). On 21/11/2016, Lewis admitted to taking photos of the building and CCTV(figure 11), and later that day Carl sent pictures of where they could dump the car(figure 12). These are the same pictures that I found on Lewis's computer file named 'potential location.docx'. Messages between Mr. Brown and Scott on 10/10/2016 showed Lewis talking about getting fired(figure 13) from Royal Mail and hating the company. The reason he got fired, was because he did not wear a seat belt correctly(figure 14). I also found messages in which Lewis's Mom reminded Mr. Scott that he still owes money to his grandpa(figure 15) (figure 16), and Carl talked about his money problems and wanting to spoil his kids. 'Youngy' agreed to join the plan on 18/10/2016, after Lewis convinced him that they could make easy money together (figure 17). While investigating Scott's gallery. I found the same images I found on the computer, like the image of a machete, car dumping spots, and a Royal Mail video in which the logo is getting burned. I also found a lot of screenshots of job applications(figure18,19,20,21,).

Timeline Reconstruction

- 1. **10/10/2016:** Lewis Scott got fired from work, he then discusses his hate for Royal Mail with Carl Brown, and since he is in debt to his Grandpa he begins searching for jobs but soon looks for quick money-making schemes out of desperation.
- 2. **Mid-October-2016:** Mr. Brown is also desperate for money, and Mr. Young expresses interest in making easy money.
- 3. **Between October/November 2016:** Mr Scott, Brown, and Young formed a partnership and they started planning a robbery and identified West Monkseaton Post Office as their target. They begin searching for equipment needed for the robbery, such as hammers and guns, as documented in Gear.docx.
- 4. **Mid-November-2016:** They searched for a getaway car and locations to dispose of it after the robbery. They also secured a £600 loan to purchase the car.
- 5. **Late-November-2016:** With the help of insider Ami Louise, they obtained the safe code and layout of the post office.
- 6. **30/11/2016:** Scott, Young, and Brown executed the robbery at West Monkseaton Post Office, using the information and resources gathered during their preparation (Master plan.docx).

Potential Leads

- Locate the getaway car using the "location" I found in "get rid of car loc" folder.
- Track down Ami Louise to understand her involvement and gather a confession.
- Investigate the loan source (paydayluk.co.uk) used to purchase the car.
- Find M3 Portable Hard Drive 1TB.

The digital forensic analysis of Lewis Scott's devices provided significant evidence to support the investigation of the robbery. Incriminating documents like "Master Plan.docx" and message exchanges reveal that the device owner participated in the occurred events.

Section 2

This report aims to inform small businesses about possible cyber threats and possible mitigations. In my forensic investigation, two key themes emerged that facilitated Mr. Scott and his accomplices in executing a well-organized robbery: Insider help and OSINT.

The insider provided Mr. Scott with access to the floor plan and safe code, and on the day of the robbery, she intentionally left the door open for him and his accomplices. Based on the evidence I found earlier, Mr Scott performed passive reconnaissance. I know this because I found that he searched for the targeted post office on Google Maps and he did annotations of external areas to identify potential escape routes. Not only he performed passive reconnaissance but he also performed active reconnaissance by taking pictures of both the exterior and interior of the building, including the locations of CCTV cameras. the insider's actions and Mr. Scott's use of OSINT demonstrated how these vulnerabilities can be exploited to plan and execute criminal activities effectively on unprotected businesses. Unfortunately small/medium businesses have a limited budget, for these reasons they are vulnerable because they are not able to mitigate these risk effectively

Insider attack

Insider threats can be referred as malicious activities originating from individuals within an organization, to intentionally harm or compromise the organization's data, system, or operations. According to a 2020 global report [3, p.1], the average worldwide cost of insider threats increased by 31% over the past two years to \$11.45 million, with incidents rising by 47% during that time. A 2018 survey by, the U.S. State of Cybercrime Survey indicates that 25% of cyberattacks are committed by insiders and 30% of people who replied to the survey indicated that incidents caused by insider attacks are more costly and damaging than outsider attacks [1, p.1]. Unfortunately, businesses frequently overlook protection against insider threats. For example, in the case of the post office robbery mentioned earlier, the establishment had CCTVs and safes to safeguard its assets. However, due to a lack of protection to prevent insider attacks, Mr. Scott was able to exploit this vulnerability and successfully carry out the robbery. Many other businesses employ similar security measures without adequate protection against insider threats, which makes them highly susceptible to such attacks. Insiders may have different goals but the most common objectives are fraud, sabotage of infrastructure, and theft of IP[3,p.4]:

- Inside fraud: This occurs when the insider is motivated by financial goals. This type of attacker can cause huge damage to small/medium organizations, financially, and reputation-wise, because it can discourage potential customers and partners.
- Insider threat sabotage: This is when the attacker's goal is to sabotage the organization's system and security by using for example malware, privilege escalation etc. Their motive could range from dissatisfaction to stress.
- IP theft: This occurs when the attacker steals source code or customer information without authorization. This type of insider attack could cause enormous damages to small/medium businesses because it may lead to a breach of trust, potentially leading to loss of customers[3,p.4]:.

Prevention of insider attack

To safeguard against insider attacks, small/medium companies should design a tailored training program to ensure employees understand and comply with security policies and recognize threats like malware and phishing. These trainings should focus on safeguarding data through encryption and regular backups and on creating strong passwords that need to be "renewed" as frequently as possible.[4, p.16]

Furthermore, it would be ideal if small/medium businesses could regularly review and communicate their security policies and guidelines for device and network usage to their employees. To further motivate employees to adhere to security policies, small/medium companies could offer small rewards for completing training or following protocol[4, p.20]. In the case of the forensics examination, if regular security checks were performed then someone could have easily spotted the door that the insider intentionally left open. If the open door had been spotted and locked on time, then this could have easily prevented Mr. Scott and his accomplice from escaping.

Managing ex-employees is another crucial aspect of preventing insider threats. An employee account should be terminated as soon as an employee leaves the company, this should effectively mitigate the risk from fired employees[4, p.20]. Furthermore, current employees should avoid directly communicating with the ex-employee regarding business matters or reactivating a former employee's account. In the forensic investigation I conducted, Ami continued communicating with Mr. Scott regarding business matters and this enabled him to exploit this relationship to his advantage and gather information about his target. Small/medium companies should also implement detection mechanisms. Some cybersecurity vendors offer services to create individual risk scores for employees based on factors like their role, online activity, and access level[4, p.20]. These risk scores help prioritize efforts in investigating and responding to insider attacks. If the small company can't use risk scores, then they can pay attention to Insider threat indicators for example the use of new unapproved personal devices, without coordinating with IT, submitting requests to access drives, documents, or applications that were not previously required by the employee, and displaying sudden interest in the company security tools and policies.[4, p.20]

Small/medium businesses should frequently back up their data and ensure that systems are updated regularly to prepare themselves for potential breaches[4, p.26]. Another mitigation strategy to reduce insider threat risk is to only grant necessary access privileges based on the employee's job role. [4, p.25] Small organizations should start with minimal permissions for new employees and adjust permissions as necessary over time. For example, in the forensics investigation, I conducted, I found that Ami had the code to the safe that contained the post office's assets, this should not have been the case because she was not the manager of that post office. For these reasons, we can conclude that limiting access to this information could have potentially prevented the robbery.

It is important to make sure that employees are happy and satisfied because when an employee is supported, he is less likely to cause harm to the organization[4, p.27].

OSINT

OSINT refers to the overall process of collecting and analyzing data based on publicly available information[5,p 1]. This process can be considered a double-edged sword because on one side the data gathered can be used to track down cyber criminals or prevent cyber-attacks from occurring but on the other side, data gathered can be used by cybercriminals to plan a cyber-attack against the target company[5,p 2]. For these reasons, small businesses should be cautious, as such attacks can be executed by individuals without hacking experience, and provide them with a lot of knowledge regarding the employees, the business, and its operations. In the case of the forensic investigation I conducted, I found a lot of evidence that proves that Mr. Scott used Google Maps to look up the post office and marked possible escape routes around it. He also took photographs of both the building's interior and exterior, including the locations of CCTV cameras. Without the online research he conducted, Mr. Scott would likely not have had sufficient information to plan the robbery.

To perform OSINT there are 4 steps. The first step is to understand where and how to get the information regarding the target. The second step is to gather every data based. The third step is to refine the collected data by filtering out irrelevant data. The last step is to summarise and analyse the findings.

OSINT prevention strategy

There are different ways to minimize the risks of OSINT for small/medium businesses [6,p.1]:

- As I mentioned earlier, Osint is used by attackers to gather information about a
 company, but companies can use this to their advantage too. Small companies can
 search for OSINT about their organization to see what information regarding their
 company is publicly available and based on the data they collect about their
 organization's network, systems, and employees, they can then utilize this information
 to pinpoint security vulnerabilities that could be exploited by attackers and then they
 could find solutions to fix these vulnerabilities.
- Even if vulnerabilities are identified and addressed, untrained employees can still pose significant risks to the organization, for these reasons, companies should train their employees to recognize and respond to potential cyber threats, establish SOPs, and promptly change compromised credentials.
- Lastly, it is also important to implement physical security measures such as having security staff because it can deter potential threats. If we consider the forensic investigation, Mr. Scott's ability to take photographs of the CCTV and post office layout without being detected or stopped suggests that a lack of physical security can allow attackers to freely perform active reconnaissance. Therefore, small companies should consider having at least a small team of security staff to improve their security measures.[4]

Other Cybersecurity risks

During my forensic investigation, I analysed the image of Mr. Scott computer and found all his deleted files, for these reasons, I think managing the risk of data recovery from disposed hard drives is essential for companies to protect their sensitive information. Without proper precautions, discarded hardware poses a risk, as someone could recover and exploit the data stored on it. To reduce this risk, companies should use specialized software to fully erase data from hard drives, they should encrypt the data and if possible, physically destroy the hard drive.

Unfortunately, insider attacks, OSINT, and deleted data are not the only concern for small/medium companies because by using information gathered from those attacks, the attacker can perform a phishing attack.

A phishing attack is when a cybercriminal pretends to be from a legitimate source and uses fake emails, messages, or websites to lure individuals into revealing sensitive information regarding their organization.

According to the 2020 Proofpoint annual report [7,p.15], phishing attacks are increasingly prevalent and have become a prominent tool in cybercrime. The study revealed that 90% of organizations have been targeted by phishing attacks. Within these organizations, 88% faced spear-phishing attacks, 83% encountered voice phishing, 86% experienced social media phishing, 84% dealt with SMS phishing, and 81% reported malicious USB drops. When comparing these figures to data from the 2019 Proofpoint annual report [7,p.15] and the 2021 APWG report [8, p.4], it shows that each year there is an exponential increase in phishing attacks specifically phishing email attacks. Phishing attacks via email pose a significant cybersecurity threat, and unfortunately, there have been many successful attacks. A notable example is the FACC attack [9, p.3], in which this company fell victim to a \$61 million Business Email Compromise scam in 2016. An impostor posing as the president of a company deceived the CEO into transferring 61 million dollars to the attacker's account. Despite the company taking legal action and dismissing the CEO after the attack, the transferred money was irretrievable. This is one of the many cases in which organizations fell victim to this attack. Losing 61 million would be a huge loss for a small company for these reasons, companies should find mitigation strategies against this attack.

In a phishing attack, the attacker typically follows several stages. First, in the "Planning stage," they research potential targets using publicly available information, known as OSINT, to find individuals with valuable data. Next, in the "Creation stage," they craft deceptive emails, often targeting employees. These phishing emails usually exploit human vulnerabilities like curiosity, greediness, trust, inattention to details, and overreliance on technology. By using these vulnerabilities, the attacker can encourage the victim to click links, download infected attachments, and provide sensitive information regarding their organization. Lastly, in the "Collection/Covering Tracks stage," the attacker gathers the stolen information and attempts to erase any evidence of the phishing campaign.

Phishing mitigations

Even for this attack, the best effective mitigation strategy for organizations would be to offer employee training because offering additional cybersecurity training to employees can enhance their awareness, as a result, it decreases the likelihood of them becoming victims of a phishing scam. The issue with this approach is that small to medium-sized companies may lack the

budget to invest in cybersecurity training. To address this, I found a paper [10] that proposes ways to optimize training costs while also being effective at reducing the risk of successful phishing. The solution is to use a Risk score to identify high-risk users and low-risk users. Based on this, high-risk users are assigned more training, and low-risk users are assigned less. For example, a company with 1000 employees that delivers 60-minute training per month to each employee, will have a total of 60000 minutes every month. By implementing the solution proposed earlier, the high-risk employee (top 10%) will be assigned 60 minutes per month and the low-risk employee will be assigned 20 minutes per month. This totals to 42,000 minutes of training per month for all employees, saving the company 18,000 minutes. This approach not only optimizes training time but also raises awareness among high-risk individuals about the vulnerabilities they pose to the organization, prompting them to be more cautious.

Conclusion

By implementing these strategies and fostering a culture of cybersecurity awareness, small businesses can significantly enhance their cyber defense posture, safeguard their assets and sensitive information, and maintain trust with their customers and partners.

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Figure 4

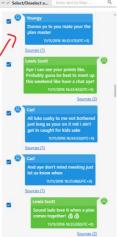


Figure 5



Figure 6



Figure 7



Figure 8

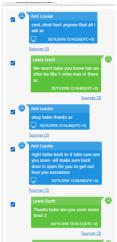


Figure 9



Figure 10



figure 11



figure 12



figure 13

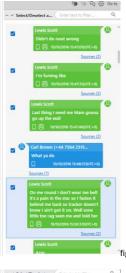


figure 14

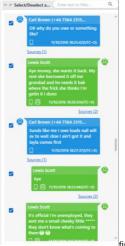


figure 15



figure 16

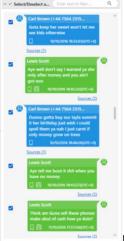


figure 17



figure 18

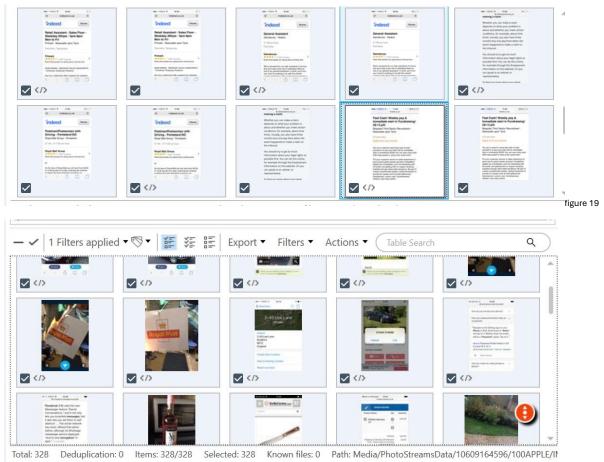


Figure 20

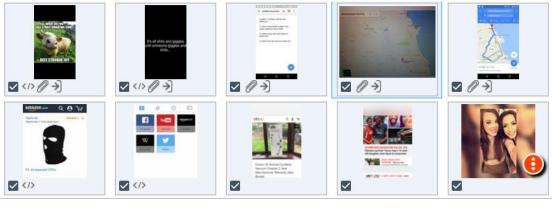


Figure 21



figure 22

		66	08/11/2016 19:44:37(UTC+0)	One Step Checkout	http://hunters-knives.co.uk/onestepcheckout/index/	
1	\checkmark	67	08/11/2016 19:43:54(UTC+0)	One Step Checkout	http://hunters-knives.co.uk/onestepcheckout/index/	1
1	~	68	08/11/2016 19:43:54(UTC+0)	L.	http://hunters-knives.co.uk/checkout/	1
	\checkmark	69	08/11/2016 19:43:54(UTC+0)	•	http://hunters-knives.co.uk/checkout/	1
	\checkmark	70	08/11/2016 19:43:54(UTC+0)	One Step Checkout	http://hunters-knives.co.uk/onestepcheckout/index/	1
	\checkmark	71	08/11/2016 19:43:33(UTC+0)	Buy the SOGfari Machete 13" @ Hunters Kn	http://hunters-knives.co.uk/machete-knives/sogfari-machete-13-inc	1
1	$\overline{\checkmark}$	72	08/11/2016 19:43:33(UTC+0)	Buy the SOGfari Machete 13" @ Hunters Kn	http://hunters-knives.co.uk/machete-knives/sogfari-machete-13-inc	1
1	~	73	08/11/2016 19:43:05(UTC+0)	Survival Machete Buy Now from Hunters K	http://hunters-knives.co.uk/machete-knives.html	1
1	\checkmark	74	08/11/2016 19:43:05(UTC+0)	Survival Machete Buy Now from Hunters K	http://hunters-knives.co.uk/machete-knives.html	1

Figure23

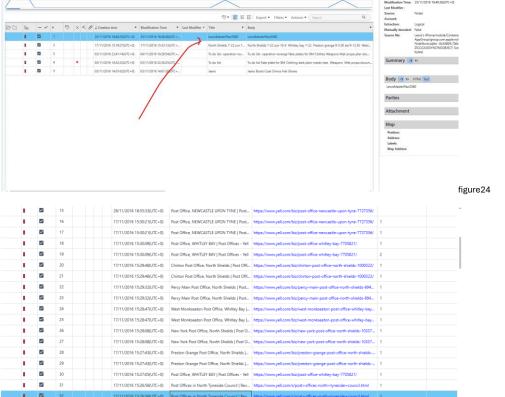


figure 25