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SHORT VERSION

COBALT

evolution and joint operations

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Introduction

On March 26, 2018, Europol reported the arrest of the Cobalt gang leader in Alicante, Spain. Cobalt is one of the most aggressive criminal groups, responsible for targeted attacks on banks and financial services providers worldwide. The scale of their activities is broad: according to Europol, the group has been linked with thefts of approximately one billion euros from 100 banks in 40 countries: Russia, the United Kingdom, the Netherlands, Spain, Romania, Belarus, Poland, Estonia, Bulgaria, Georgia, Moldova, Kyrgyzstan, Armenia, Taiwan, Malaysia and others.

Group-IB forensic specialists were amongst the first to investigate Cobalt's attacks on banks, and in November 2016 issued a public report on the activities of the group. Since then we have continuously analyzed the evolution of their tactics and tools.

Initially, hackers focused on logical attacks on ATMs. But their targets developed and the Cobalt group successfully stole multiple times from payment gateways and card processing systems. By the end of 2017, for the first time in Russia, they made a successful attack on a bank using the system of interbank transfers (SWIFT). The Central Bank of Russia considers that Cobalt are the main threat to the Russian financial industry.

For a considerable time, Cobalt's continued success was because the hackers of the group constantly tested new tools and schemes, often changing the location of attacks and familiarizing themselves with how internal banking systems functioned. After gaining access to computers on a target bank, Cobalt often spent three to four weeks to study the internal infrastructure of the organization, collecting information about and observing the function of payments systems, and only then conducting their attack. The average damage from each successful attack was 1.5 million USD based on incident response conducted by Group-IB and publicly disclosed estimates from Europol.

The arrest of the Cobalt gang leader in Alicante, Spain, occurred significantly before the official announcement on March 26th. It has not yet led to the conclusion of attacks against financial institutions from this targeted attack group. On the date of the official announcement, Group-IB's Computer Emergency Response Team identified spear phishing emails which were sent by Cobalt acting as SpamHaus, a well-known non-profit organization that fights against spam and phishing. Continued attacks in South East Asia have been identified into April 2018.

Key findings

Cybercrime investigations

Group-IB has been investigating targeted attacks and cybercrime for over 14 years. Through incident response and joint investigations with law enforcement, we have monitored joint operations of various cybercriminal groups and the recruitment of individual hackers to commit attacks on banks and other organizations. We expect that this trend will only intensify over the coming years. This report publicly discloses the joint operations of the Cobalt Group and Anunak (Carbanak) which were identified privately before arrests, and provides an overview of their key attacks in the period 2016 - 2017.

In 2016, Group-IB released the first public report on Cobalt providing detailed information on their attacks, which is available online. This attributed the appearance of the Cobalt group with the termination of another infamous gang – Buhtrap. There was a three month break between the last Buhtrap attack and the first Cobalt attack. In these three months, Cobalt prepared infrastructure and committed thefts through SWIFT in Hong Kong and Ukraine. We were confident that Cobalt was involved in these attacks because of the unique loader (stager). It was found in these incidents and has only been used by Cobalt. However, these attacks as well as their method of cashing out money were surprisingly sophisticated. This indicated that Cobalt group did not act alone. Communication with the Carbanak group was discovered only 18 months later (in 2017), when during incident response we detected the same unique SSH backdoor that was employed by the Carbanak group in 2014.

First success

Cobalt's first major independent success was the attack on First Bank's ATMs in Taiwan, where they managed to steal $2.18 million. Around the time of Group-IB's public report, Cobalt began to act more cautiously, switching to attacks on card processing, which are less dangerous for the money mules involved. Simultaneously, the group also began to reinvest into their TTP – modifying their exploits and stagers to complicate their detection and attribution.

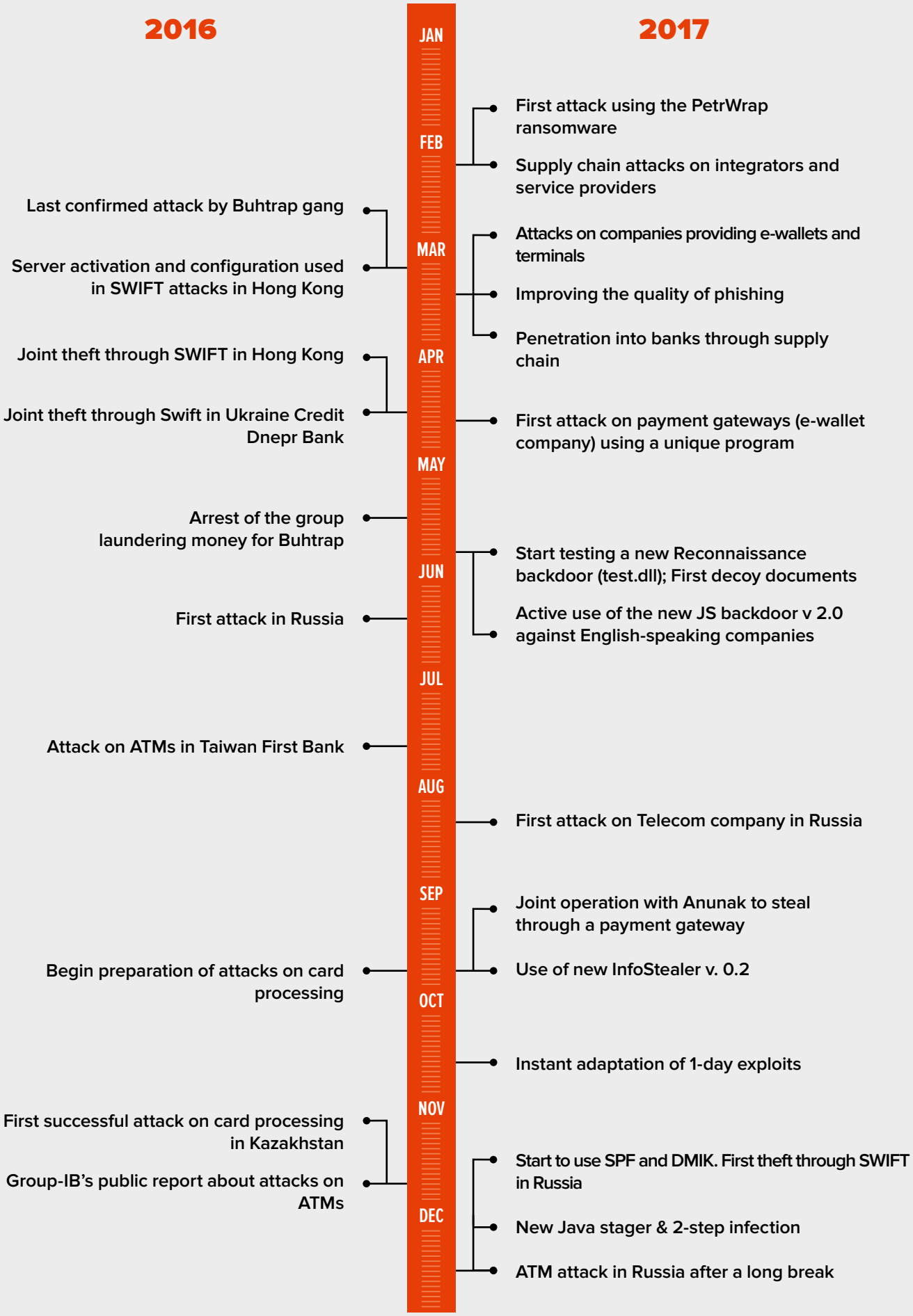
In September 2016 Cobalt gained access to the networks of a bank in Kazakhstan and began preparations for a new type of theft – through card processing. This took around 2 months to prepare for the attack and in November they successfully stole about $600,000. The theft timeframe was subsequently streamlined for card processing attacks. Following this, card processing has become a major theft target in banks worldwide. See Group-IB's report on MoneyTaker group for more information.

Importantly, focusing on card processing has made attacks safer for 'money mules' who deal with cash withdrawals as they no longer have to be specific ATMs (as in logical attacks). Their safety became a priority for the group after mules had been detained in Taiwan, Romania, and Russia.

Arms Race

In 2017, Cobalt invested heavily into their technology – from reverse engineering of malware samples, it appears likely they enlisted a team of developers who created new tools for Cobalt group, and adjusted exploits in order to evade detection by security vendors.

The most significant development events of Cobalt



Their work allowed Cobalt to act more efficiently: hours after PoCs for 1-day exploits were posted publicly, Cobalt group began using modified versions in attacks on banks and updated them in real time to avoid detection.

New tools and tactics allowed them to attack their targets - SWIFT, card processing, and payment gateways – with more success and set a "personal best" in attempting to steal over 25 million EUR from a European bank via card processing.

New tools and modified programs employed by Cobalt in 2017 are described below:

- **Petya.** Cobalt encrypted the network of one small bank in Russia using this now well-known ransomware. After they failed to steal money through card processing, hackers used a self-developed modification of Petya ransomware named PetrWrap. This low-level modification is written in C. It is worth noting that to create such modification the author should be able to disassemble and clearly understand how and what they want to modify, which indicates a high level of technical skills. The majority of computers in the bank's network were disabled, which mildly complicated incident response and investigation.
- **JavaScript backdoor.** In May, they began testing a new tool, the PE library (DLL), which was used as a reconnaissance module. However, this tool was never employed by the group, as they shifted to test a new JavaScript backdoor, which was designed to perform reconnaissance and complicate their discovery and analysis. This backdoor was used for the first time in attacks leveraging compromised servers of an integrator in the US. The malware was delivered through high-quality phishing emails with real reports from the SWIFT system attached. The program was used in attacks not only in the CIS countries and Eastern Europe, but also for attacks on western English-speaking companies.
- **InfoStealer.** In September Cobalt implemented JavaScript backdoor functionality in the executable file, but without the ability to load and run. In September attack they used InfoStealer 0.2. This only exists in memory and does not leave traces in the file system. This tool was employed in attacks on insurance agencies, the media, and software developers, whose compromised infrastructure was further used for attacks on banks.
- **Recon Backdoor (CobInt).** In December, they started using a new Java loader, generated by the CobaltStrike framework, but with a unique payload that loads a unique Recon backdoor CobInt. The backdoor receives the modules from the C&C server for further execution. This complicated attack vector is very similar to the tactics used in targeted attacks by professional state-sponsored attackers and the Lurk group.

Supply chain attacks

A major change in the tactics of Cobalt was the shift towards indirect attacks.

In February, we tracked the first successful attack on a system integrator, which was then used as a vehicle by Cobalt for further attacks on companies in Russia, Kazakhstan, Moldova, as well as their subsidiaries in other countries. During the next 9 months, Cobalt infiltrated at least four integrators located in Ukraine, the US, and Russia.

Non-typical targets

In March 2017, Cobalt began to prepare attacks on companies that provide electronic wallets and payment terminals. In April, they adopted an attack scheme and created a unique program to automatically generate fraudulent payments through payment gateways. In September, the group for the first time attacked an e-wallet vendor and successfully stole funds through a payment gateway. In this incident Group-IB was able to discover clear evidence of Carbanak involvement.

More recently, the group has begun to attack insurance agencies and the media. In these attacks, they obtain control of mail servers or accounts to further use the victim's infrastructure for attacks on banks.

Cobalt: reboot

Cobalt returned in 2018 in fine form - both in terms of technology and infrastructure. The March arrest of the Cobalt gang leader in Spain has not yet led to the conclusion of attacks against financial institutions by this group. Remaining members reduced their activity in Russia and the CIS, temporarily focusing on other regions. It is interesting to note that phishing emails, which were tracked in March, purported to be from US companies, for example, IBM, Verifon, Spamhaus:

On March 7-10, letters were sent from the domains ibm-cert.com, ibm-warning.com, ibm-notice.com.

On March 15, a new phishing campaign was detected – hackers employed the dns-verifon.com domain, leveraging the brand of VeriFon, the largest vendor of POS terminals.

On March 26, phishing emails were sent acting as SpamHaus, a well-known non-profit organization that fights against spam and phishing. For this campaign, the attackers registered the spamhuas.com domain, which is indistinguishable from the official one (spamhaus.org).

On April 3, emails sent from the compromised mail server of the Swedish company were tracked.

On May 23, Group-IB detected a new phishing attack launched by Cobalt, targeting banks in Russia, the CIS, and purportedly western countries.

For the first time, phishing emails purported to be from a large anti-virus vendor.

Given the technological evolution of the group and the fact that in spite of the arrests of the Cobalt gang leader and malware writer, Cobalt has continued to strike, the most likely scenario is that remaining Cobalt members will join existing groups or a fresh "redistribution" will result in a new cybercriminal organization 'Cobalt 2.0' continuing attacks on banks worldwide.

Targeting Card processing

As early as in September Cobalt gained access to the network of a bank in Kazakhstan and began preparations for a new type of theft – through card processing. It took 2 months to prepare for the attack and in November they successfully stole $600,000. In 2017, the Cobalt group set a “personal best” in attempting to steal over 25 million EUR from a bank in Central Europe.

Cobalt learnt a lesson: when attacked banks and their ATMs were located in the same country, the mules who withdrew cash were often arrested.

Their safety became a priority for the group after mules had been detained in Taiwan, Romania, and Russia. **Focusing on card processing has made attacks much safer for money mules due to the following factors:**

- No need for complex cash-out schemes. Attackers withdrew cash immediately.
- All that was needed was to obtain or buy some bank cards to ensure cashing out.
- Withdrawing money in another country helped hackers to gain time, since the bank’s security team could not promptly contact the police and obtain video records from surveillance cameras.

The scheme is extremely simple:

- They legally opened or illegally bought cards of the bank whose IT system they had hacked.
- Money mules – criminals who withdraw money from ATMs – with previously activated cards deployed and waited for the operation to begin.
- After getting into the card processing system, the attackers removed or increased cash withdrawal limits for the cards held by the mules.
- They removed overdraft limits, which made it possible to go overdrawn even with debit cards.
- Using these cards, the mules withdrew cash from ATMs, one by one.

Step-by-step timeline of the attack on card processing

Step 1. Infection:

- On **September 7, 2016,** phishing e-mails with malicious attachments containing the Cobalt Strike payload were sent to various e-mail addresses including those of bank employees.
- On **September 8, 2016,** at 08:38:45, the malware ensured persistence on an employee's workstation and started distributing Cobalt Strike across the bank's IT infrastructure.
- On **September 9, 2016,** Cobalt Strike was downloaded on different workstations, after which the hackers gained a covert communication channel for monitoring the bank's IT infrastructure and taking control of all active nodes.
- From **September 9, 2016 to November 10, 2016,** the hackers collected data on domain and local user accounts using Cobalt Strike tools.

Step 2. Reconnaissance:

- On **November 10 - 30, 2016,** the hackers explored the card processing system using Cobalt Strike and compromised user accounts.
- They performed multiple connections to the system in order to develop several alternative routes for access to the control module.
- System capabilities were explored in order to detect specific settings of card accounts, setting credit limits, changing limitations on cashing out from card accounts.

Step 3. Money mule preparation:

- From **November 4 to December 12, 2016,** the criminals opened legitimate multicurrency cards in 4 different branches of a bank in Kazakhstan.
- Most of the issued cards were transferred from Kazakhstan to the Russian Federation, Latvia, Estonia, France, Austria, Germany, the Netherlands and Belgium.

Step 4. Theft:

- On **December 18, 2016,** a standard withdrawal scheme was implemented. The hackers, having gained unauthorized access to the bank's IT infrastructure, connected to the payment system using compromised accounts, set credit limits for their cards and removed cashing out limits for these cards.
- On **December 18-19, 2016,** a trained group of money mules performed cashing out according to set credit limits at the command of cash-out organizers.
- On **December 19, 2016,** the bank employees discovered an illegitimate setting of credit limits and, at 11:30 cancelled all cards and card accounts.
- On **December 20, 2016,** the last attempt of money mules to withdraw money was tracked.

Indicators

Hashes

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SHORT VERSION

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