Participant Handbook
Ransomware Tabletop Exercise

Version 2.0 – January 17, 2020

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1. Session I –Introductions & Background

Introductions and Role Assignment

Please briefly introduce yourselves to the group by name, title and area of responsibility within your organization. If your group believes that any important organizational component for incident response is not represented, assign those roles amongst yourselves. If at any point during this exercise you feel another organizational component should be present, make a note of it and assign that role within your group.

Background

Ransomware is an emerging threat to a variety of industries and is characterized by The National Institute of Standards and Technology as a type of malware that attempts to deny access to a user's data usually by encrypting it with a key known only to the hacker who deployed the attack until a ransom is paid.

The purpose of this tabletop exercise is to test your organization's preparedness to respond to a ransomware incident in a no-fault environment and to develop a better understanding of how incident response works.

Group discussion

Please briefly describe your and your organization's familiarity with ransomware using the questions below:

1. What steps have your groups' organizations taken to improve their resiliency to ransomware attacks?

2. Does your organization have somebody at the organization responsible for tracking the news/threat intelligence?

Name:

Position:

Reports to:

3. What news feeds or organizations is your organization subscribed to?

2. Session I – Inject #0

You arrive at work. All indications are that it will be a normal day.

3. Session I – Inject #1

High-level scenario

After a normal day, you receive an article about a ransomware incident affecting a European transportation company. Please take 5 minutes to read the article and answer the discussion questions below.

NOTE: Real news articles/social media posts about a ransomware attack on Spanish company Everis have been included throughout as examples of how ransomware attacks have been reported by companies, company employees and the media. For this tabletop exercise, please imagine that the embedded articles relate to transportation companies as described in the high-level scenario.

https://www.cbronline.com/news/spain-ransomware-attacks

BREAKING – Spanish Businesses Hit by Wave of Ransomware Attacks

- **Ed Targett** **Editor** 4th November 2019

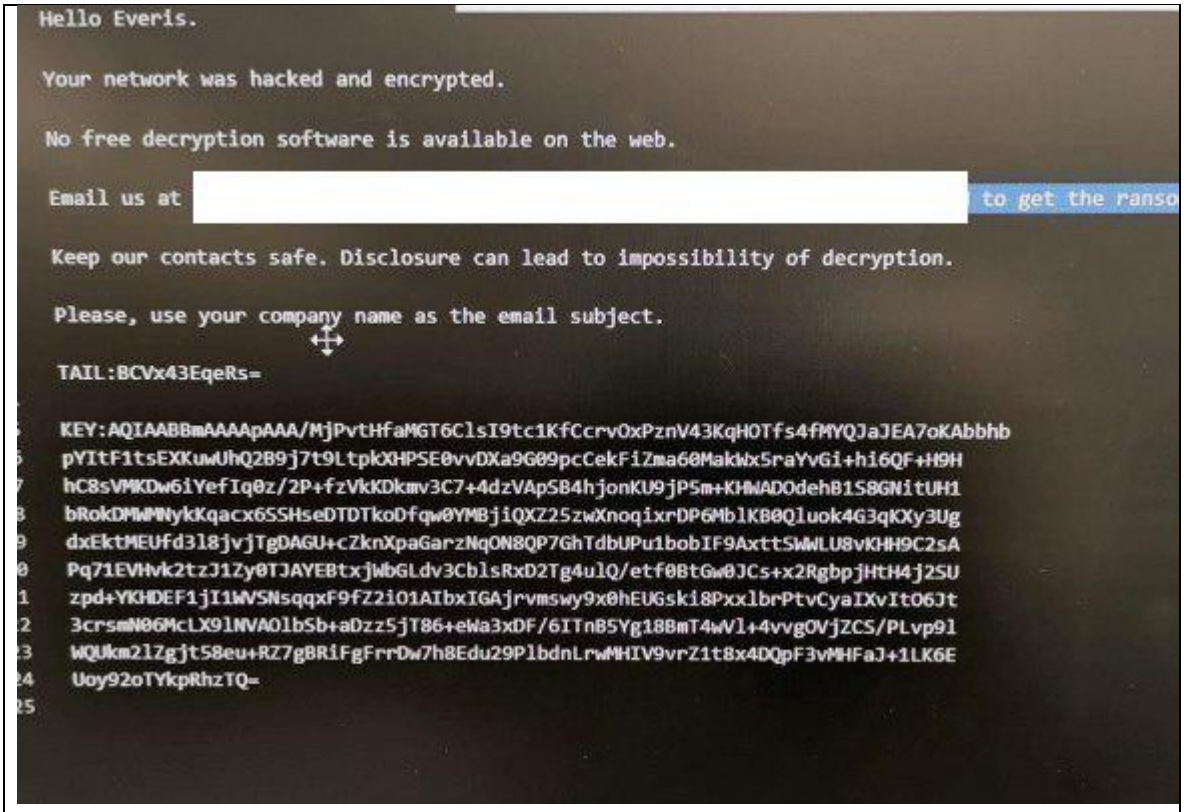
Numerous companies hit, ransomware details not yet known

UPDATED 13:50 BST 4/11/19 with more details, government comment.

Spain has been hit by a wave of ransomware attacks today, with NTT Data-owned Everis – a major IT consultancy – and national radio station SER among those reported to be affected.

Embarrassingly for Everis, it apparently offers its own "seamlessly integrated" cybersecurity services, including "security auditing, pentesting, vulnerability analysis and any other service focused on the proactive identification of vulnerabilities and weaknesses."

The company has yet to respond to requests for comment.



A screengrab of the reported ransomware message at Everis. Credit: https://bitcoin.es/actualidad/everis-se-encuentra-sufriendo-un-hackeo-cryptografico/

“We are in hysteria mode” a technician from one of the companies hit told Spanish news media this afternoon.

The specific type of ransomware payload or the vulnerability they are exploiting have not yet been reported, but has various been named as Ryuk and Bitpaymer. Speculation is rife that the attack involves the exploitation of the so-called Bluekeep vulnerability, after an explosion of Bluekeep malware was detected over the weekend.

#everis #Ransomware pic.twitter.com/HR9ilkxWAc

— Miguel (@Dormidera) November 4, 2019

Spain’s largest radio station SER (Sociedad Española de Radiodifusión) confirmed it had been hit in a statement this afternoon saying it had suffered an attack “of the ransomware type… which has had a serious and widespread effect on all of all its computer systems.”

Aena @aena, biggest airport operator in Spain, also reporting they're taking down their networking services (LAN & VPN) due to cyberattack. pic.twitter.com/8b7QxrFVSV

— Sound (@Sound1618) November 4, 2019

UPDATED 14:35 BST 4/11/19 with Aena comment.

Major airport operator Aena confirmed to Computer Business Review that it categorically had ***not*** been impacted by the attacks, but had just taken precautionary measures to protect its

networking systems. Despite reports to the contrary, Accenture also insisted it had not been affected.

SER, meanwhile, is being “kept running by its headquarters in Madrid, supported by autonomous teams”, the company said in a Spanish language statement.

“The technicians are already working for the progressive recovery of the local programming of each of their stations.”

The country’s Department of Homeland Security played down the attacks, saying in an otherwise detail-free blog post that “this type of attack occurs quite frequently. In 2016, the National Cybersecurity Institute handled some 2,100 similar incidents…

“It does not compromise data security nor is it a data leak.”

The department confirmed SER had been hit and that it was a ransomware attack: “The infection path appears to be a file attached to an email (” La vía de infección parece ser un fichero adjunto a un correo electrónico”).

Discussion questions

1. What are the important takeaways from the article?

2. How does your organization react to this news?

3. Who is likely to be forwarded this information first?

4. Session I – Inject #2

High-level scenario

The attached EXERCISE MOCKUP of an FBI Private Industry Notification is about an attempt by unknown actors to deploy ransomware malware on European freight carriers. It is based on the real-world Ryuk ransomware PIN which affected hospitals across the globe. Please take 5 minutes to read the PIN and answer the discussion questions below.

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TLP: GREEN

Private Industry Notification

FEDERAL BUREAU OF INVESTIGATION, CYBER DIVISION

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The following information is being provided by the FBI, with no guarantees or warranties, for potential use at the sole discretion of recipients to protect against cyber threats. This data is provided to help cyber security professionals and system administrators guard against the persistent malicious actions of cyber criminals.

This PIN has been released TLP: GREEN: The information in this product is useful for the awareness of all participating organizations within their sector or community, but should not be shared via publicly accessible channels.

Unknown Cyber Actors Attempted to Deploy Ransomware Malware on European Freight Transportation Carriers

Summary

FOR EXERCISE PURPOSES ONLY

Unknown cybercriminals have targeted more than 100 US and international businesses with EXERCISE ransomware since approximately August 2018. EXERCISE encrypts files on network shares and an infected computer's filesystem. Once the victim has been compromised, the actors encrypt all the network's files and demand sums of up to $5 million worth of Bitcoin (BTC) in exchange for a decryptor program. EXERCISE's targets are varied and indiscriminate, but attacks focus on organizations with high annual revenues in hopes of extracting larger ransoms from the victims. While EXERCISE is generally undiscerning about victims, attacks have had a disproportionate impact on logistics companies, technology companies, and small municipalities.

Technical Details

EXERCISE first appeared as a derivative of Ryuk ransomware, which first emerged in late 2018 and available for sale on the open market as of November 2019. Exercise still retains some aspects of Ryuk code. For example, all of Exercises files contain the "RYUK" tag but some of the files have .EXR added to the filename, while others do not. In other parts of the ransomware code, EXERCISE has removed or replaced features of its predecessor, such as the restriction against targeting specific Eurasian-based systems.

FOR EXERCISE PURPOSES ONLY

The exact infection vector remains unknown as EXERCISE deletes all files related to the dropper used to deploy the malware. In some cases, EXERCISE has been deployed secondary to Trickbot and/or Emotet banking Trojans, which use Server Message Block (SMB) protocols to propagate through the network and can be used to steal credentials. In one case, the ransomware appears to have used unsecured or brute forced Remote Desktop Protocols (RDPs) to gain access. After the attacker has gained access to the victim network, additional network exploitation tools may be downloaded, including PowerShell Empire, the Microsoft Sysinternals tool psexec, or the penetration testing tool Cobalt Strike.

Once executed, EXERCISE establishes persistence in the registry, injects into running processes, looks for network connected file systems, and begins encrypting files. EXERCISE utilizes AES-256 to encrypt files and uses an RSA public key to encrypt the AES key. The EXERCISE dropper drops a .bat file which tries to delete all backup files and Volume Shadow Copies (automatic backup snapshots made by Windows), preventing the victim from recovering encrypted files without the decryption program. The “EXERCISEReadMe” file the ransomware places on the system after encryption provides two email addresses, using end-to-end encrypted email providers Protonmail and/or Tutanota, through which the victim can contact the attacker(s). While earlier versions provide a ransom amount in the initial notifications, EXERCISE users are now designating a ransom amount only after the victim makes contact. The attacker(s) tell the victim how much to pay to a specified BTC wallet for the decryptor and will provide a sample decryption of two files.

The FBI does not encourage paying a ransom to criminal actors. Paying a ransom may embolden adversaries to target additional organizations, encourage other criminal actors to engage in the distribution of ransomware, and/or may fund illicit activities. More importantly, paying the ransom does not guarantee that a victim’s

TLP: GREEN

Private Industry Notification

FEDERAL BUREAU OF INVESTIGATION, CYBER DIVISION

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files will be recovered. For instance, with this variant, testing shows success when running the decryption as 'admin'. Additionally, initial testing reports that the "EXERCISEReadMe" file does not need to be present for the decryption script to run successfully but other reporting advises that some files will not decrypt properly without it. Even if run correctly, there is no guarantee the decryptor will be effective. This is further complicated by the fact that the "EXERCISEReadMe" file is deleted when the script is finished which may affect the decryption script unless it is saved and stored in a different location before running. In all cases, the FBI encourages organizations to contact their local field office immediately to report a ransomware event.

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Indicators:

The following indicators of compromise have been observed in samples of EXERCISE malware.

Host Based Indicators:

- Mutex: “efkrm4tgkl4ytg4”, “FakeMutex”
- Registry:
  - KeyName: "HKEY_CURRENT_USER\SOFTWARE\Microsoft\Windows\CurrentVersion\Run";
  - Value: "EXERCISE";
  - Date Type: "REG_EXR";
- File:
  - Depending on the Windows version, one of the following:
    - "C:\users\Public\sys"
    - "C:\Documents and Settings\Default User\sys"
  - Numerous identical "ransom note" files:
    - "EXERCISEReadMe.txt"
    - Numerous encrypted files, which were not renamed, but have the "EXER" tag followed by an encrypted key at the end of the file;
- Some malware samples add ‘.EXR’ to the end of encrypted filenames

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Network Indicators (not common):

- HTTP GET request:
  - GET /Lfkgnt5lkgngl3knfl3.php?UI=v9&ID=1140 HTTP/1.1;
- User-Agent string
  - "Microsoft Internet Explorer";
- IP address: 9.999.999.998

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Information Requested:

If you or your company is found to be a victim of EXERCISE ransomware, the FBI is seeking any information, including:

- Recovered executable file
- Copies of the "read me" file – DO NOT REMOVE the file or decryption may not be possible
- Live memory (RAM) capture
- Images of infected systems
- Malware samples
- Log files
- E-mail addresses of the attackers
- A copy of the ransom note
- Ransom amount and whether or not the ransom was paid
- Bitcoin wallets used by the attackers
- Bitcoin wallets used to pay the ransom (if applicable)
- Names of any other malware identified on your system
- Copies of any communications with attackers

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Recommended Mitigations

Determining the initial point and method of compromise is critical to preventing reoccurrence since there is both the initial network compromise and exploitation and the persistence mechanism of the ransomware itself. There have been victims who experience a second EXERCISE infection after remediation because a single workstation was offline when remediation occurred.

The FBI recommends that any victims of EXERCISE take the following steps, to include, but not limited to:

- Scan system backups for registry persistence
- Scan system backups for other malware infections, particularly Trickbot and/or Emotet
- Execute a network-wide password reset
- Enact multifactor authentication
- Ensure network segmentation
- Ensure all file backups are located offline

FOR EXERCISE PURPOSES ONLY

Reporting Notice

The FBI encourages recipients of this document to report information concerning suspicious or criminal activity to their local FBI field office or the FBI's 24/7 Cyber Watch (CyWatch). Field office contacts can be identified at www.fbi.gov/contact-us/field. CyWatch can be contacted by phone at EXERCISE or by e-mail at EXERCISE. When available, each report submitted should include the date, time, location, type of activity, number of people, and type of equipment used for the activity, the name of the submitting company or organization, and a designated point of contact. Press inquiries should be directed to the FBI's National Press Office at EXERCISE@fbi.gov

Discussion questions

1. Go over the PIN with your group. What are the significant findings?

2. Who receives this information? Do they know it is their responsibility?

Name:
Position:
Reports to:

3. What should they do after they read it?

4. Which internal/external parties is the information shared with?

5. What technical steps does the IT team take in this case?

6. Is there any additional information your organization would request at this time? How would they get this information?

7. What information does the IT team share with the Operations team?

8. What does Operations do when they learn about a “heightened cyber security risk?”

5. Session II – Background

The Help Desk receives a report of a system issue.

6. Session II – Inject #3

High-level scenario

Janet at the help desk receives a call from George who works at a loading dock. George is reporting that workstations in the loading docks are displaying messages asking for $500,000 in bitcoin.

Discussion questions

1. What should Janet do? What should George do?

2. What is the escalation protocol for incidents like this? What other business units become involved? Who gets the call?

3. What external parties does your organization reach out to?

4. Do you contact business partners? What business partners do you reach out to? Do you have an offline backup of critical contacts?

5. Do you contact customers at this time? If so, what do you tell them?

6. Does your organization have a policy regarding paying the ransom?

7. Session II – Inject #4

High-level scenario

Loaders and drivers at multiple locations are reporting that they are unable to access navigation data, route planning information, or cargo manifests. Operations have stalled and ground to a halt.

Discussion questions

1. What do you tell the drivers and loaders?

2. Does your organization have a continuity of operations or operations resiliency plan?

3. What are the essential services needed to maintain a diminished operating capacity?

4. Does your organization have a plan to procure hardware and software services to maintain critical functionality?

8. Session II – Inject #5

High-level scenario

Ransomware has taken hold in enterprise servers. Internal and external sites are experiencing major disruptions and not functioning. Enterprise email is no longer functioning.

Discussion questions

1. How does your organization communicate and coordinate containment and recovery?

2. What is the first string of response? Who makes the call? At what point is senior management involved?

3. What external parties (if any) does your organization reach out to? What law enforcement organizations does your company reach out to?

4. Who does your organization appoint to manage parallel efforts and prioritize the response process?

5. Does your organization take any systems offline? Which systems?

9. Session II – Inject #6

High-level scenario

Disgruntled customers are calling in to your customer support office and complaining that deliveries are not arriving and tracking information is no longer available.

Discussion questions

1. Does your organization have a prepared communications statement for the customer services department?

2. What should the operations team tell the customer?

3. As the calls become more frequent, call centers are having difficulty handling the volume of calls coming in. Do you have a plan to expand call center capacity?

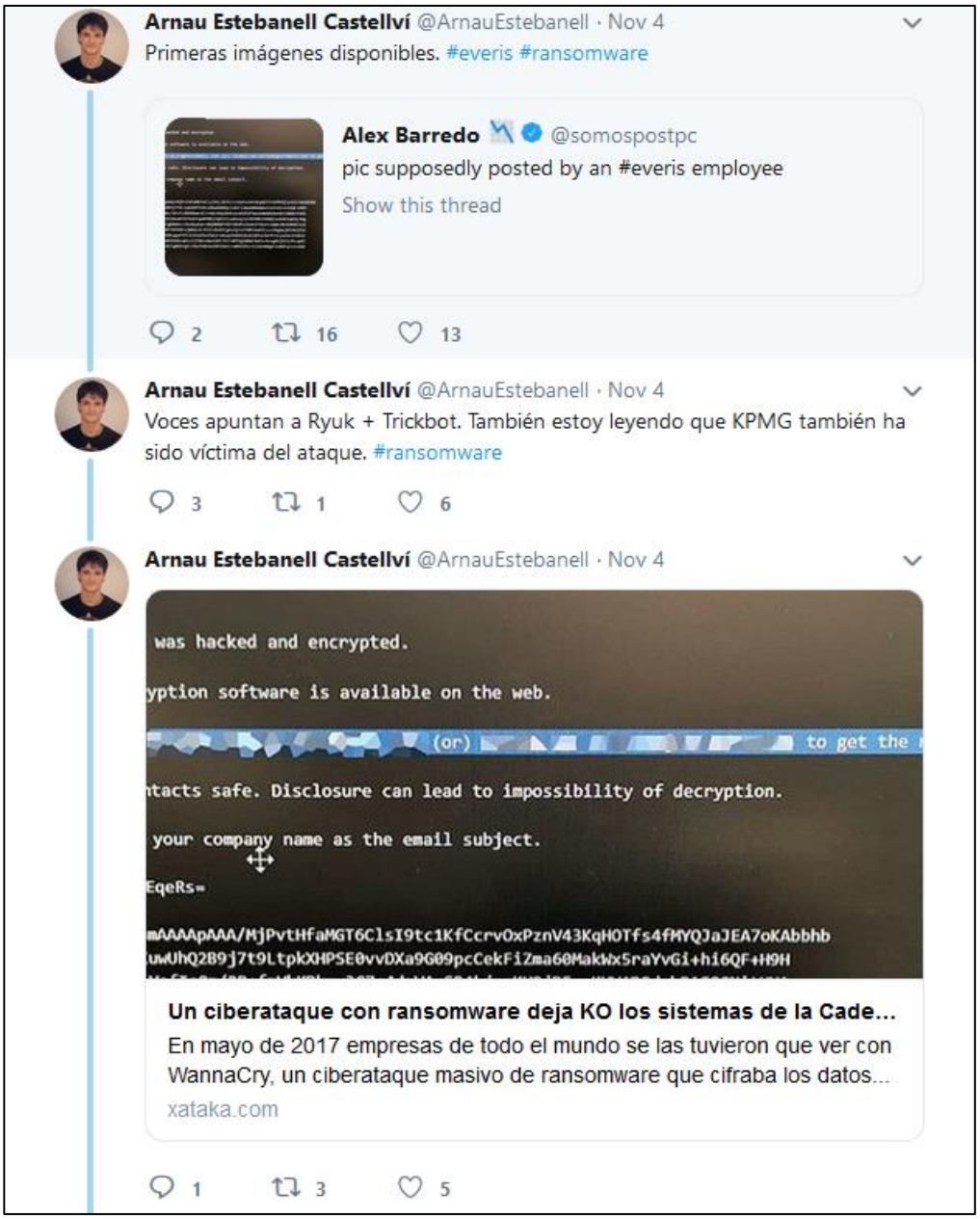
10. Session II – Inject #7

High-level scenario

A picture of a ransomware screen on a company branded device goes public on social media and a news agency contacts your organization seeking a comment.

NOTE: For this portion of the exercise, please imagine that the embedded articles below relate to transportation companies and the screen shots appear as in the high-level scenario described. Sometimes, particularly for organizations with global reach, the first social media or media reports may not be posted in English.

Twitter post by a Cyber Security Consultant of a screen shot reportedly taken by an Everis employee



Discussion questions

1. Does your organization have a prepared communications statement for the media representative?

2. Who is authorized to speak on behalf of the company?

3. What should folks authorized to speak to the news agency say?

11. Session II – Inject #8

High-level scenario

A social media report of an alleged ransomware attack on your company is picked up by mainstream media before your company has decided whether the attack should be publicly acknowledged. At this time, the attack is still spreading across multiple departments and locations, the infection mechanism remains unknown and the impact cannot be fully assessed. Your company is still deciding who, if anyone, is authorized to speak on this issue. A news agency contacts your organization seeking a comment. Phone systems and the corporate website are no longer available.

NOTE: For this portion of the tabletop exercise, please assume that a news story was released based on the initial social media post above as the source report of the alleged ransomware infection. Please assume the story is updated throughout the day and is picked up by other media sources.

https://www.bleepingcomputer.com/news/security/ransomware-attacks-hit-everis-and-spains-largest-radio-network/

Ransomware Attacks Hit Everis and Spain's Largest Radio Network
By Sergiu Gatlan
November 4, 2019 12:56 PM

Everis, an NTT DATA company and one of Spain's largest managed service providers (MSP), had its computer systems encrypted today in a ransomware attack, just as it happened to Spain's largest radio station Cadena SER (Sociedad Española de Radiodifusión).

While the ransomware attacks were not yet publicly acknowledged by the company, the ransom note left on Everis' encrypted computers has already leaked and BleepingComputer can confirm that the MSP's data was infected using the BitPaymer ransomware.

BitPaymer used in MSP attack
After the attack began, Everis sent an internal notification saying that they "are suffering a massive virus attack on the Everis network. Please keep the PCs off."

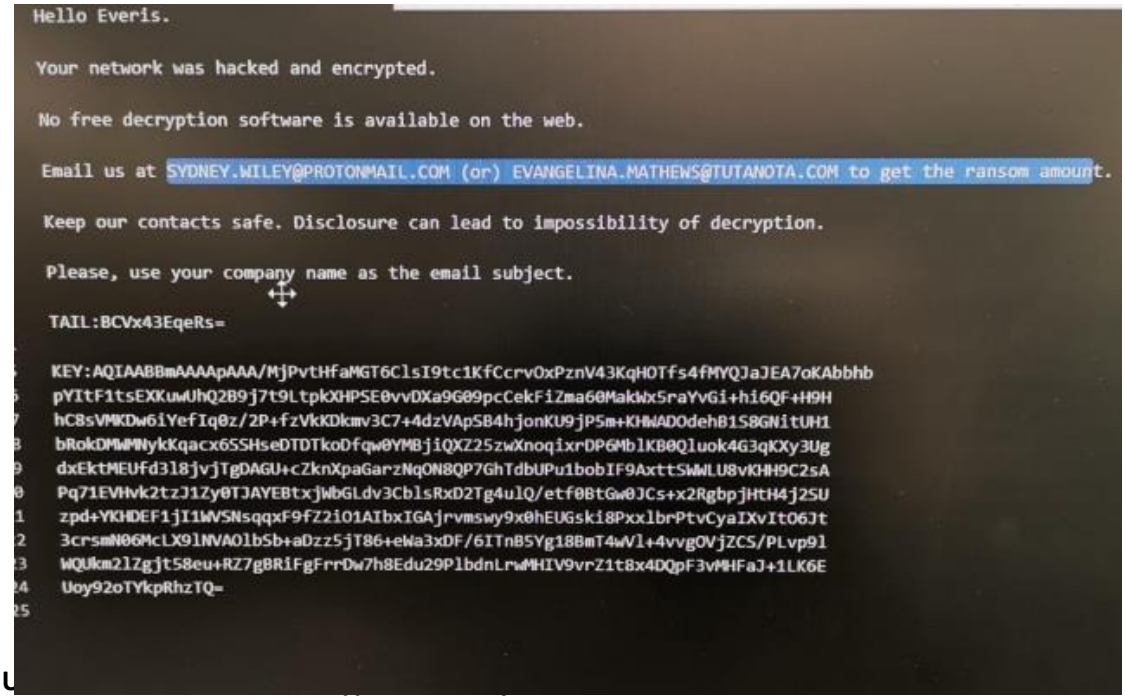
"The network has been disconnected with clients and between offices. We will keep you updated. Please, send urgently the message directly to your teams and colleagues due to standard communication problems," Everis added.

> Esta parece ser la nota que everis ha mandado a sus trabajadores.
> #ransomware pic.twitter.com/1UOT8jDO4s
> — Arnau Estebanell Castellví (@ArnauEstebanell) November 4, 2019

The ransomware encrypted files on the company's systems using the .3v3r1s extension, further exposing the targeted nature of this attack against the MSP.

The ransom note that got planted on Everis' encrypted systems warns the company against disclosing the incident while also providing it with contact details "to get the ransom amount." The email contacts listed in the ransom note are sydney.wiley@protonmail.com and evangelina.mathews@tutanota.com, but these change per targeted attack.

The attackers asked Everis for a €750,000 ($835,923) ransom to get a decryption key to unlock their files as reported by bitcoin.es.



Everis was not alone in getting hit by a ransomware attack today as Cadena SER, the largest radio station network in Spain, was also hit by an unknown ransomware.

"The SER chain has suffered this morning an attack of computer virus of the ransomware type, file encrypter, which has had a serious and widespread affectation of all its computer systems," Cadena SER says in a notification published today.

Following the attack that used an unknown ransomware strain, the radio station had to disconnect all of its computers from the Internet and it is currently continuing activity with the help of equipment at its Madrid headquarters.

"The technicians are already working for the progressive recovery of the local programming of each of their stations," Cadena SER adds.

Spain's Department of Homeland Security (Departamento de Seguridad Nacional) also confirmed the ransomware attack that impacted Cadena SER as did Spain's INCIBE (Instituto Nacional de Ciberseguridad).
INCIBE is currently helping the radio station to restore their encrypted data and get their systems back online.

Possible MSP downstream attacks
A tactic more commonly being used by ransomware attackers is to target MSPs and use their management software to push the ransomware down to the MSPs' clients.

While it is not known if these are unrelated cyberattacks, cybersecurity consultant Arnau Estebanell Castellví implied that Everis may have been the source. According to a tweet by Castellví, Orange cut off Everis' access to the network in order to prevent the ransomware attack from affecting them.

> Trabajadores de @orange_es me confirman que ellos tampoco han sido afectados por el ataque. Lo único que se ha hecho es cortar acceso a @everis y se estan tomando medidas preventivas. De momento las cosas funcionan con normalidad.
> — Arnau Estebanell Castellví (@ArnauEstebanell) November 4, 2019

BleepingComputer has not been able to independently corroborate this statement.

BlueKeep potentially exploited in the attacks
BleepingComputer has learned from a source close to one of the attacks who wishes to remain anonymous that the BlueKeep vulnerability is reportedly involved in these attacks.

Furthermore, in light of the BlueKeep mass exploitation discovered over the weekend, some say [1, 2] that this vulnerability was leveraged in today's ransomware attacks against Spanish organizations but there is no clear evidence to support this theory.

The BlueKeep exploitation attempts have been recorded by security expert Kevin Beaumont's honeypots that expose only the 3389 port used for remote assistance connections via the Remote Desktop Protocol (RDP).
Beaumont also found today that Everis has hundreds of servers directly exposed to Internet connections, something that hints at the possibility of the rumors of BlueKeep exploitation in today's ransomware attacks being true.

> Oh boy, these guys appear to have hundreds of RDP servers directly on the internet HT @binaryedgeio data pic.twitter.com/d7wGjP4J6S
> — Kevin Beaumont (@GossiTheDog) November 4, 2019

Castellví told BleepingComputer that, while "nothing is confirmed right now", Everis' internal network being down could be explained through exploiting BlueKeep or the other two RDP vulnerabilities patched some time ago.

"I think the initial vector might be email. That is what the Spanish National Security Center has said," he added. "But after patient 0, I also think it is RDP-based. If not, there is no explanation of why the internal network of Everis is down."

Whether BlueKeep was actually involved is not yet clear at this point.

Bleeping Computer asked CERT Spain, Everis, and SER for more details but did not hear back at the time of publication.

Update November 04, 13:07 EST: Added comments from cybersecurity consultant Arnau Estebanell Castellví.

Discussion questions

1. How you communicate with the teams to find out status and provide situation report/update?

2. How do you communicate with your customers?

~~3. Does your organization have a prepared communications statement for the news agent?~~

~~4. Who is authorized to speak on behalf of the company?~~

~~5~~3. What should folks authorized to speak to the news agency say?

12. Session III – Background

The attack has been contained. The organization is now focused on recovery.

13. Session III – Inject #9

High-level scenario

eOnline backups are encrypted by the ransomware and your organization is unable to roll back workstations or servers to a prior good configuration.

Discussion questions

1. Does your organization have cold offline backups? Who manages them?

2. Does your organization have a continuity of operations hot site?

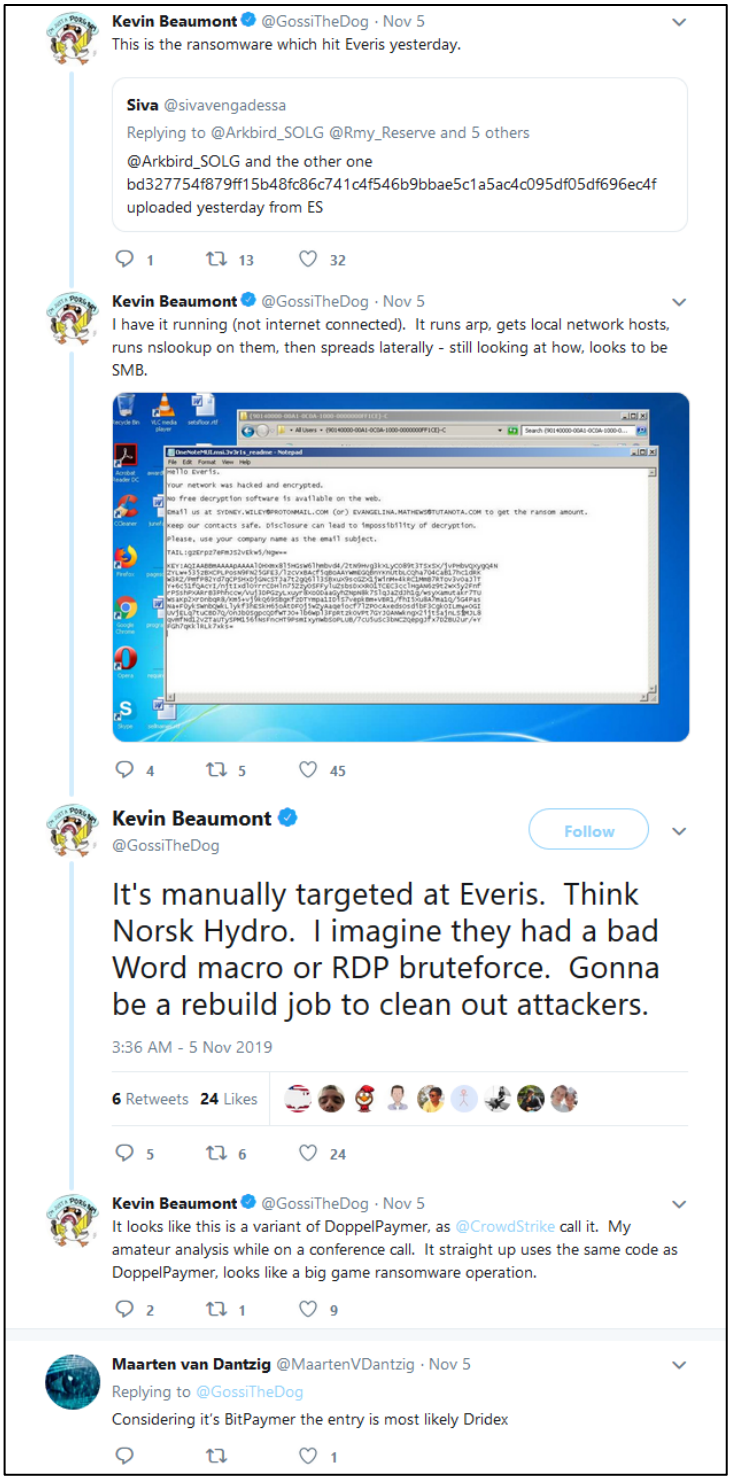
3. Has your organization identified the most critical systems to prioritize for recovery? Does your organization have a procedure to get the most critical systems up and running?

4. Does your company have access to backups of critical firmware for devices? Who has it and where can you get it?

14. Session III – Inject #10

High-level scenario

The next day, some functionality has been restored. The attack has been contained. Impact is still being assessed. The ransomware attack has been widely reported on social media and in mainstream news. Awareness of the attack is spreading among customers, suppliers and industry competitors. Many professional and amateur cyber security experts and hackers are speculating about the attack – entry methods, impact, ransomware variant, current state of recovery, etc.



Discussion questions

1. How does the organization respond to ongoing inquiries? Who is the point person for messaging?

~~2. Who is authorized to speak for the organization? Do you assign different people from multiple parts of the organization?~~

3. How do you ensure the messaging is consistent across the organization both internally and externally? How are updates communicated?

15. Session III – Inject #11

High-level scenario

Time skip ahead 3 days. A federal partner has discovered and published a remediation for the ransomware which affected your organization.

Discussion questions

1. How does this information get to your organization? What information sharing channels do you have available?

2. What changes has your organization made since the attack? Were any temporary measures put in place during attack or recovery that have been made or should be made permanent? Who is involved in the decision-making?

3. Who is responsible for determining a deployment schedule for the remediation?

4. When does the deployment begin? What are the operational impacts of patching?

5. When does your management team learn about the remediation?

16. Session III – Inject #12

High-level scenario

Jordan from Sales informs the Board at a quarterly meeting that long time clients have started to use competitors, citing a lack of confidence in the organization and disruptions to their business as a result of shipping interruptions during the recent ransomware attack. News reporters continue to follow up to ask about the impact of the attack on your organization and the total cost of the attack.

Discussion questions

1. How does your organization respond? Who is involved in assessing the impact of the attack?

2. Who is involved in deciding what messaging should be communicated internally and externally? How is the response coordinated?

3. How do you track ongoing impacts of the attack on your business?

4. Are any changes made to the IT budget or other investment decisions, such as cyber insurance?

17. Hot wash/ Debrief (90 Minutes)

Background

Exercises afford organizations the opportunity to evaluate capabilities and assess progress toward meeting capability targets in a controlled, low-risk setting. After the evaluation phase concludes, organizations should reach consensus on identified strengths and areas for improvement and develop a set of improvements that directly assess core capability gaps. This information is recorded in the AAR/IP [After Action Report/Improvement Plan] and resolved through the implementation of concrete correction actions, which are prioritized and tracked as part of a corrective action program. This process constitutes the improvement planning phase and the final step in conducting an exercise.[1]

Discussion questions

1. What went right?

2. What changes need to be made to plans and procedures to improve incident response?

3. What changes to equipment or resources are needed to improve performance?

4. What training is needed to improve performance?

5. What are the Top 3 lessons learned for approaching similar problems in the future?

Follow-up

The identification of strengths, areas for improvement and corrective actions that result from exercises help organizations build capabilities as part of a larger continuous improvement process.[2]

Each identified improvement should be turned into an organizational goal/action item for the group responsible for delivering the solution. When developing solutions, consider:

1. What are the possible short- and long-term steps that can be taken to resolve this?

2. What will yield the best results?

3. What will work the fastest?

4. What will use the least resources?[3]

[1] https://www.fema.gov/media-library-data/20130726-1914-25045-8890/hseep_apr13_.pdf
[2] https://www.fema.gov/media-library-data/20130726-1914-25045-8890/hseep_apr13_.pdf
[3] https://trainingtools.files.wordpress.com/2010/04/ebook-hotwash.pdf