Top Cybersecurity Trends Impacting Public Sector Entities

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NC Public Sector Significant Cyber Incident Statistics

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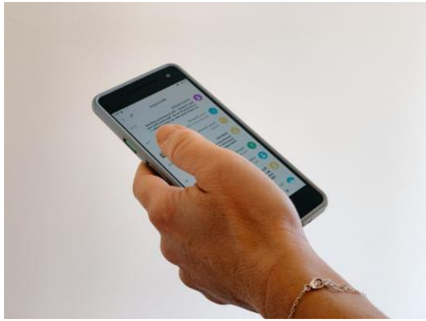
- Significant cyber attacks happen every 14 seconds worldwide
- Increase of 350% since 2018

NC Public Sector Statistics

- 2019: 10 (reported) significant cyber incidents
- 2020: 24 significant cyber incidents
- 2021: 20+ significant cyber incidents; 160+ orgs remediated*
- 2022: 15+ significant cyber incidents as of October 15, 2022 (+6-10 smaller cases)
- Downtime from significant cyber incidents increased 200 percent
- NC public sector incident costs average ~$700k-$1.5 million

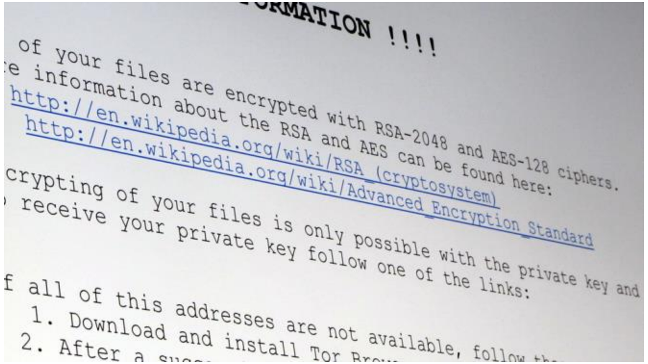
It is 11:39 pm on a Friday night…



Hey Shannon or Scott, it is Chris. We have a problem….ummm, all of our servers are locked up, our doors are not operational, we have year-end close out starting Monday, and we have no phone service. There is a note about paying a ransom on all of our machines.

What should we do?

Can you help us?



ORMATION !!!!

of your files are encrypted with RSA-2048 and AES-128 ciphers.
e information about the RSA and AES can be found here:
http://en.wikipedia.org/wiki/RSA_(cryptosystem)
http://en.wikipedia.org/wiki/Advanced_Encryption_Standard

crypting of your files is only possible with the private key and
receive your private key follow one of the links:

f all of this addresses are not available, follow th
1. Download and install Tor Brow
2. After a suc

I Hit The Bat Signal!

- Immediately contact to State JCTF, including NCLGISA Strike Team Members, to start triaging situation with impacted entity's IT staff
  - --NCEM Cyber Lead to establish scoping call with impacted entity & JCTF
    --National Guard Cyber Security Response Unit
    --NCDIT ESRMO
    --Federal Partners
    --Other key agencies based on event
  - NCLGISA stands up:
    - Zoom channel is established for comms
    - Zoom room link published to the impacted entity to provide them with live support throughout the event 24/7 (team works shifts to ensure someone comes online whenever the client logs on)

NC Joint Cyber Task Force

Formalized by EO 254

State & Local Partners

--NCLGISA Cyber Strike Team (deployed onsite within 12-18 hours)

--NC National Guard G6 (deployed onsite within 12-18 hours)

--NC DIT

--NC DPS (NCEM Cyber Unit & NC ISAAC)

Federal Partners

--FBI

--US Secret Service

--Department of Homeland Security (Cybersecurity and Infrastructure Security Agency)

Other Partners Based on Impacted Entity

--911

--NC SBI

--SBoE

--DHHS

--DPI (for all K-12 engagements)

--MCNC

--NC Community College System Office (for all CC engagements)

Boots on the Ground for Incident Response

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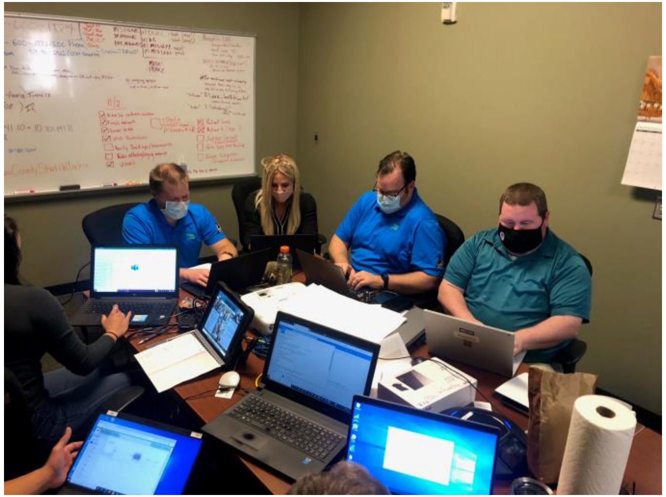
Onsite @ impacted entity within 4-12 hours of the initial scoping call

Work ~200 hours per significant incident (weekends, holidays, and after-hours are all within scope to get the job done)

Typical Strike Team and NCCCS Incident Staffing:

- 2 people on-site for days 1-2
- 1-2 folks on-site for days 3-6
- 12-16 hour operational periods when onsite
- Strike team syncs every evening for 2-3 hours to review logs, discuss game plans for rebuild during incident response
- Team members not on-site are typically reviewing CyberTriage images, logs, etc to perform what we call "sys admin forensic review/threat hunting"
- Some events take weeks or months, so those obviously consume more hours (usually after traditional day job hours and on the weekends)

Welcome to the War Room



NCLGISA Cybersecurity Strike Team

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A volunteer group of local government IT professionals, working directly with peers to improve cyber posture, reduce risk of exposure/attack, and provide incident response services during events.

Leadership and Core Members

- Scott Clark, CIO, Town of Fuquay-Varina
- Randy Cress, Assistant County Manager/CIO, Rowan County
- Mark Seelenbacher, CIO, Henderson County
- Chad Coble, CIO, Stanly County
- Ted Norris, Deputy CIO, Onslow County
- Logan Steese, CIO, Currituck County
- Amy Walker, CTO, Ashe County Schools
- Rob Hudson, IT Infrastructure Mgr, City of Greenville
- Brian May, CISO, Wake Technical Community College
- Chris Puryear, CIO, Person County
- Shannon Tufts, UNC SOG Professor

Additional Strike Team Services Available to All Public Entities

- Website with Resources: https://www.nclgisa.org/page/strike-team
- Cybersecurity pre-plan checklists and training materials
- Ongoing Shodan reviews for all government IPs (please email your public IP range(s) to itstriketeam@nclgisa.org)
- Weekly Nessus scanning for vulnerabilities (please email your public IP range(s) to itstriketeam@nclgisa.org)
- Consultation on cyber-related questions including backup strategies, centralized logging, EDR, IDS/IPS, MFA, and specific technologies
- Regular “Strike Team” office hours
  - Successfully remediated 164 public entities impacted by Microsoft ProxyLogon vulnerability by holding all-day/evening virtual sessions for 10 days, including weekends

Key Cybersecurity Legislation

G.S. 143-800, amended by SL2021-180

G.S. 143B-1320, amended by SL2021-180

G.S. 143B-1379(c), amended by SL2021-180

Article 84, Various Technology Regulations.

GS143-800: State entities and ransomware payments.

(a) No State agency or local government entity shall submit payment or otherwise communicate with an entity that has engaged in a cybersecurity incident on an information technology system by encrypting data and then subsequently offering to decrypt that data in exchange for a ransom payment.

(b) Any State agency or local government entity experiencing a ransom request in connection with a cybersecurity incident shall consult with the Department of Information Technology in accordance with G.S. 143B-1379.

(c) The following definitions apply in this section:

(1) Local government entity. – A local political subdivision of the State, including, but not limited to, a city, a county, a local school administrative unit as defined in G.S. 115C-5, or a community college.

Cybersecurity Incident Reporting Requirement

G.S. 143B-1379(c), amended by SL2021-180

(c) Local government entities, as defined in **G.S. 143-800(c)(1)**, shall report cybersecurity incidents to the Department. Information shared as part of this process will be protected from public disclosure under G.S. 132-6.1(c). Private sector entities are encouraged to report cybersecurity incidents to the Department.

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A Significant Cybersecurity Incident…

- **G.S. 143B-1320(a)(14a)** Ransomware attack. – A cybersecurity incident where a malicious actor introduces software into an information system that encrypts data and renders the systems that rely on that data unusable, followed by a demand for a ransom payment in exchange for decryption of the affected data.

- **G.S. 143B-1320(a)(16a)** Significant cybersecurity incident. – A cybersecurity incident that is likely to result in demonstrable harm to the State's security interests, economy, critical infrastructure, or to the public confidence, civil liberties, or public health and safety of the residents of North Carolina. A significant cybersecurity incident is determined by the following factors:

  a. Incidents that meet thresholds identified by the Department jointly with the Department of Public Safety that involve information: 1. That is not releasable to the public and that is restricted or highly restricted according to Statewide Data Classification and Handling Policy; or 2. That involves the exfiltration, modification, deletion, or unauthorized access, or lack of availability to information or systems within certain parameters to include (i) a specific threshold of number of records or users affected as defined in G.S. 75-65 or (ii) any additional data types with required security controls.
  b. Incidents that involve information that is not recoverable or cannot be recovered within defined timelines required to meet operational commitments defined jointly by the State agency and the Department or can be recovered only through additional measures and has a high or medium functional impact to the mission of an agency

Methods of Contact to Report Cybersecurity Incident

- **NCLGISA Strike Team:** itstriketeam@nclgisa.org or (919) 726-6508 (monitored 24/7)

- **NC EM 24 Hr Watch:** 800-858-0368 (monitored 24/7)

- **FBI IC3: https://www.ic3.gov/**
  - If you have a situation involving financial fraud, please contact the FBI first because there is a ~72 hour window for fund recovery before it is moved off-shore.

- **NCDIT:** https://it.nc.gov/resources/cybersecurity-risk-management/statewide-cybersecurity-incident-report-form

Top Cyber Trends

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Trend #1

SOCIAL ENGINEERING

The clever manipulation of the natural human tendency to trust.

Recognize These?

- What was your favorite teacher’s name?
- What was the name of your childhood pet?
- What was your childhood best friend’s name?
- What was the first car you had?
- Where were you born?
- What was the name of your high school?

Trend #2 & #3

#2: Big Shift in TA Behavior: Data Exfil without Encryption

“When are we gonna stop calling it ransomware? It's just data kidnapping now!”

“LockBit has advised affiliates to exfiltrate & extort, not encrypt.”

Data Exfiltration, No Encryption

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- Conducted via various tactics (SQL injections or TA access to data within systems)
- Can happen over extended periods of time
- Ransom for data not to be sold/posted
- Recent cases indicate the impacted entity was unaware of the data exfiltration until it was found posted on the internet by a 3rd party
- Breach notification may be required depending on the type of data exfiltrated

Legal Issues with Data Exfil

- Most agencies don’t have sufficient logging to determine what data was removed

- Hard to validate extent of breach notice requirements

#3: Ransomware

- Ransomware is a type of malware that attempts to extort money from user or organization by infecting or taking control of the victim's computer, files, servers, etc.

- Ransomware usually encrypts files, folders, machines, servers to prevent access and use unless the ransom is paid to receive the decryption key.

- Data exfiltration has become more widespread as part of ransomware events in the past 24 months.

Ransomware Attack Timeline

M1
- An employee opens a phishing email and clicks on a link containing ransomware.

M2
- The ransomware downloads onto the employee's computer and starts executing malicious code.

M3
- The ransomware creates a connection via the Internet with the threat actor's command and control (C2) server.

M4
- The ransomware steals/harvests credentials to gain access to more accounts.

M5
- The ransomware looks for files to encrypt on local computers and on servers via the network, moving laterally across the network to compromise multiple accounts. Data exfiltration might also be occurring during this timeframe.

M6
- The ransomware starts the encryption process, typically attacking domain controllers and backups first. The government is now aware they have been compromised. The threat actor leaves a ransom note demanding payment in exchange for the decrpytion key.

Common Attack Vectors

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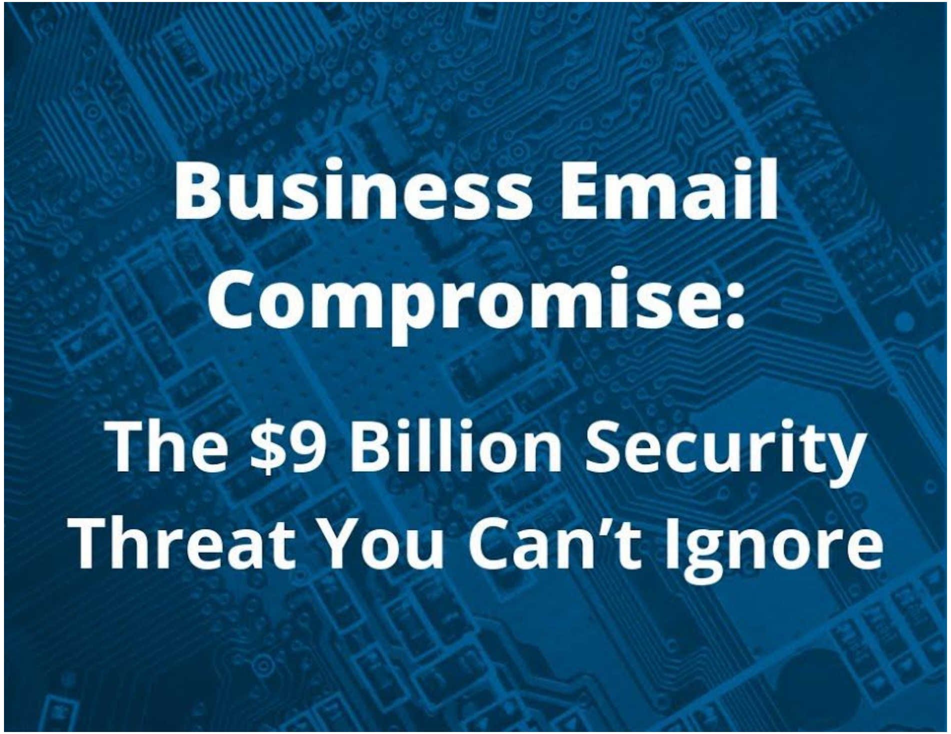
- Phishing emails loaded w/ malware
- Password brute forcing
- Remote Desktop Protocol
- VPN exploits
- Other unpatched CVEs
  - Microsoft applications
- Outdated infrastructure
- **Open ports per vendor instructions**

Trend #4

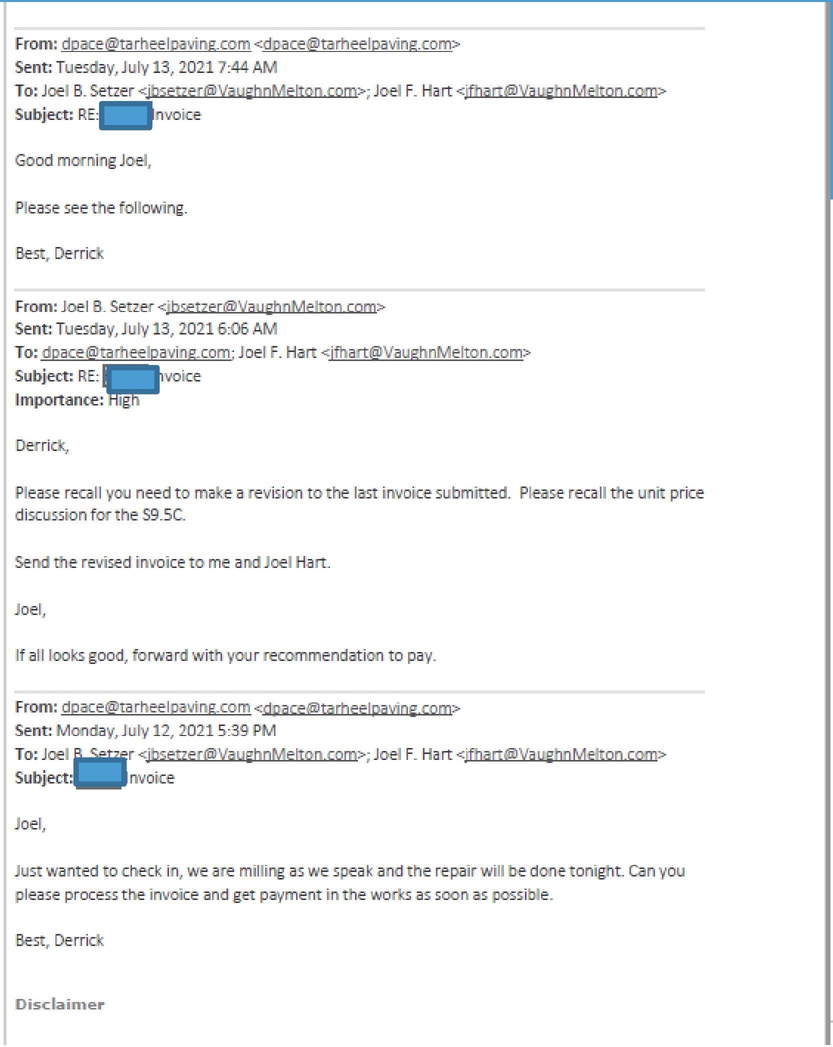


Business Email Compromise:

The $9 Billion Security Threat You Can't Ignore

Just a Normal Day…

Making Moves, Processing Payments



From: dpace@tarheelpaving.com <dpace@tarheelpaving.com>
Sent: Tuesday, July 13, 2021 7:44 AM
To: Joel B. Setzer <jbsetzer@VaughnMelton.com>; Joel F. Hart <jfhart@VaughnMelton.com>
Subject: RE: [redacted]Invoice

Good morning Joel,

Please see the following.

Best, Derrick

From: Joel B. Setzer <jbsetzer@VaughnMelton.com>
Sent: Tuesday, July 13, 2021 6:06 AM
To: dpace@tarheelpaving.com; Joel F. Hart <jfhart@VaughnMelton.com>
Subject: RE: [redacted]voice
Importance: High

Derrick,

Please recall you need to make a revision to the last invoice submitted. Please recall the unit price discussion for the S9.5C.

Send the revised invoice to me and Joel Hart.

Joel,

If all looks good, forward with your recommendation to pay.

From: dpace@tarheelpaving.com <dpace@tarheelpaving.com>
Sent: Monday, July 12, 2021 5:39 PM
To: Joel B. Setzer <jbsetzer@VaughnMelton.com>; Joel F. Hart <jfhart@VaughnMelton.com>
Subject: [redacted]Invoice

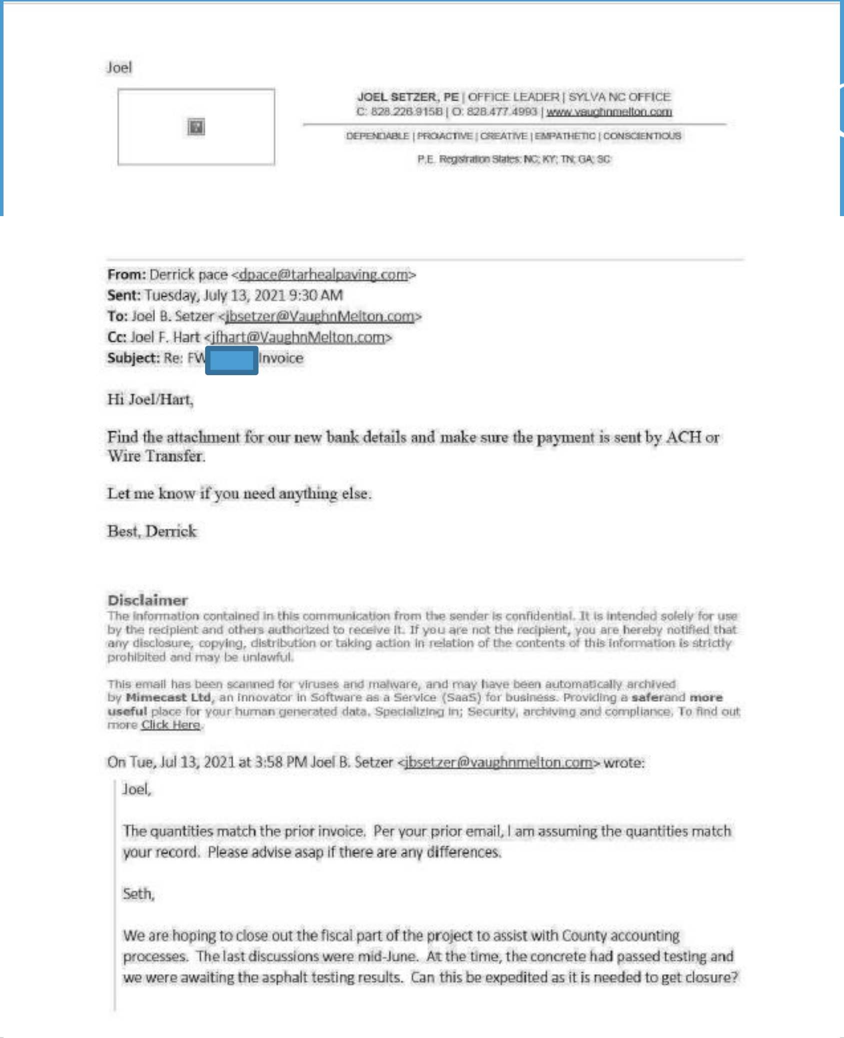
Joel,

Just wanted to check in, we are milling as we speak and the repair will be done tonight. Can you please process the invoice and get payment in the works as soon as possible.

Best, Derrick

Disclaimer

What Can Possibly Go Wrong?



Joel

JOEL SETZER, PE | OFFICE LEADER | SYLVA NC OFFICE
C: 828.228.9158 | O: 828.477.4993 | www.vaughnmelton.com

DEPENDABLE | PROACTIVE | CREATIVE | EMPATHETIC | CONSCIENTIOUS

P.E. Registration States: NC; KY; TN; GA; SC

From: Derrick pace <dpace@tarhealpaving.com>
Sent: Tuesday, July 13, 2021 9:30 AM
To: Joel B. Setzer <jbsetzer@VaughnMelton.com>
Cc: Joel F. Hart <jfhart@VaughnMelton.com>
Subject: Re: FW [redacted] Invoice

Hi Joel/Hart,

Find the attachment for our new bank details and make sure the payment is sent by ACH or Wire Transfer.

Let me know if you need anything else.

Best, Derrick

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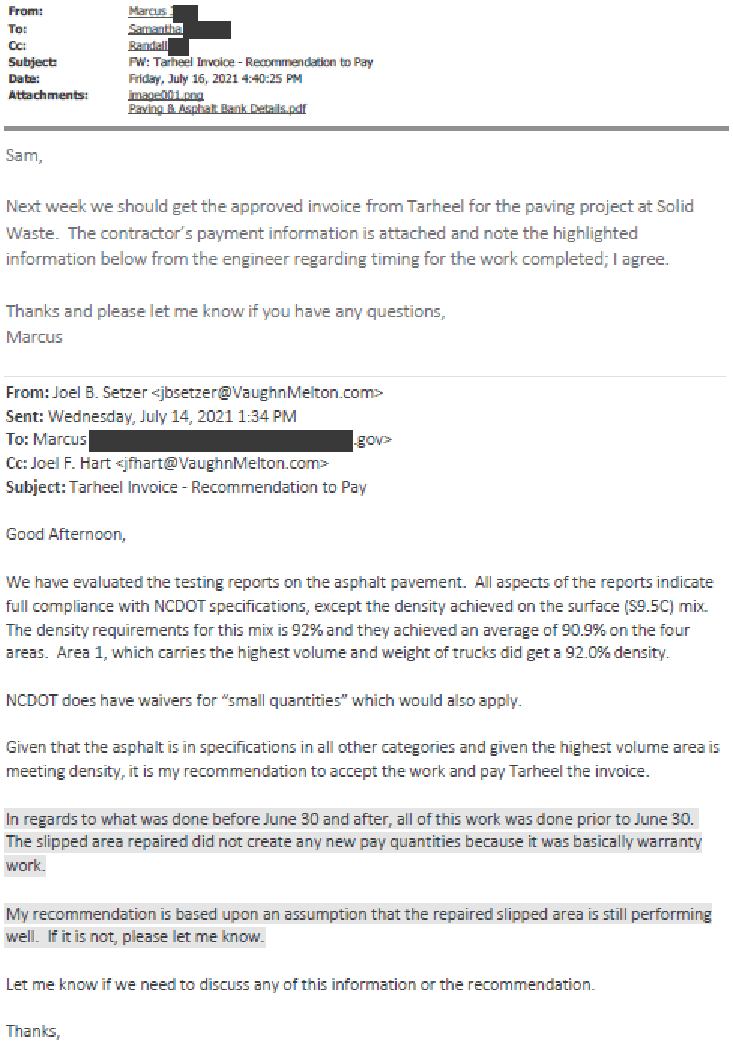
On Tue, Jul 13, 2021 at 3:58 PM Joel B. Setzer <jbsetzer@vaughnmelton.com> wrote:

> Joel,
>
> The quantities match the prior invoice. Per your prior email, I am assuming the quantities match your record. Please advise asap if there are any differences.
>
> Seth,
>
> We are hoping to close out the fiscal part of the project to assist with County accounting processes. The last discussions were mid-June. At the time, the concrete had passed testing and we were awaiting the asphalt testing results. Can this be expedited as it is needed to get closure?

Seems Good to Me… So Let's Cut That Check!



From: Marcus [redacted]
To: Samantha [redacted]
Cc: Randall [redacted]
Subject: FW: Tarheel Invoice - Recommendation to Pay
Date: Friday, July 16, 2021 4:40:25 PM
Attachments: image001.png
Paving & Asphalt Bank Details.pdf

Sam,

Next week we should get the approved invoice from Tarheel for the paving project at Solid Waste. The contractor's payment information is attached and note the highlighted information below from the engineer regarding timing for the work completed; I agree.

Thanks and please let me know if you have any questions,
Marcus

From: Joel B. Setzer <jbsetzer@VaughnMelton.com>
Sent: Wednesday, July 14, 2021 1:34 PM
To: Marcus [redacted].gov>
Cc: Joel F. Hart <jfhart@VaughnMelton.com>
Subject: Tarheel Invoice - Recommendation to Pay

Good Afternoon,

We have evaluated the testing reports on the asphalt pavement. All aspects of the reports indicate full compliance with NCDOT specifications, except the density achieved on the surface (S9.5C) mix. The density requirements for this mix is 92% and they achieved an average of 90.9% on the four areas. Area 1, which carries the highest volume and weight of trucks did get a 92.0% density.

NCDOT does have waivers for "small quantities" which would also apply.

Given that the asphalt is in specifications in all other categories and given the highest volume area is meeting density, it is my recommendation to accept the work and pay Tarheel the invoice.

In regards to what was done before June 30 and after, all of this work was done prior to June 30. The slipped area repaired did not create any new pay quantities because it was basically warranty work.

My recommendation is based upon an assumption that the repaired slipped area is still performing well. If it is not, please let me know.

Let me know if we need to discuss any of this information or the recommendation.

Thanks,

But Things Weren't As They Appeared

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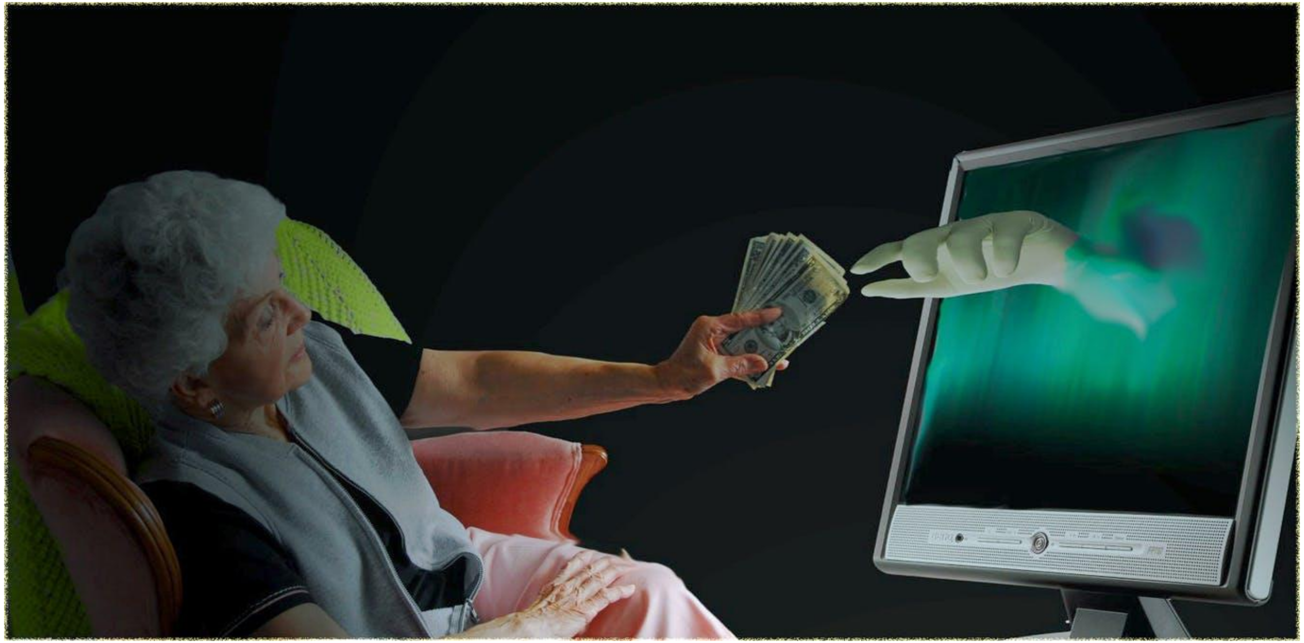

Did You Catch It?

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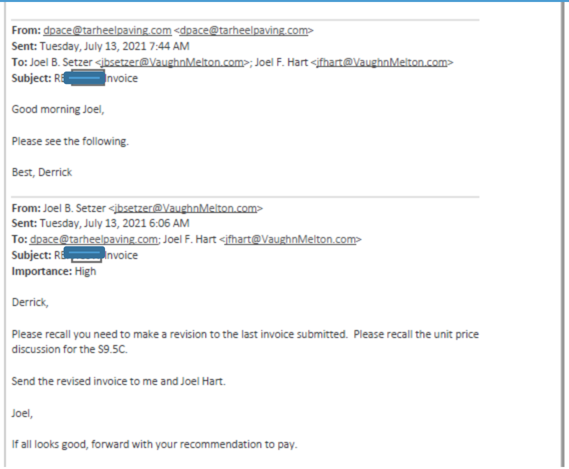

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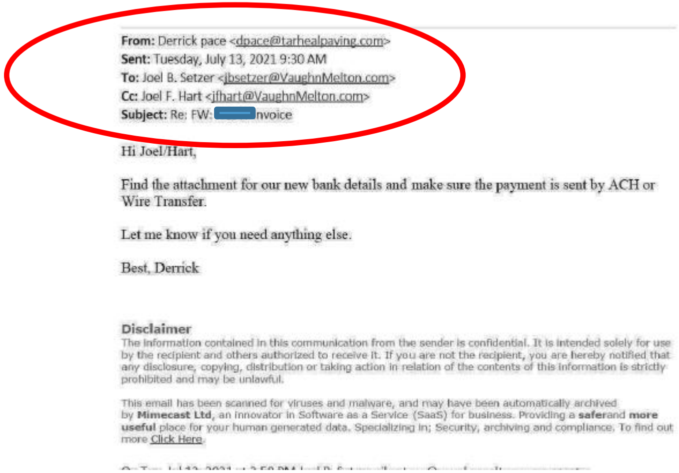

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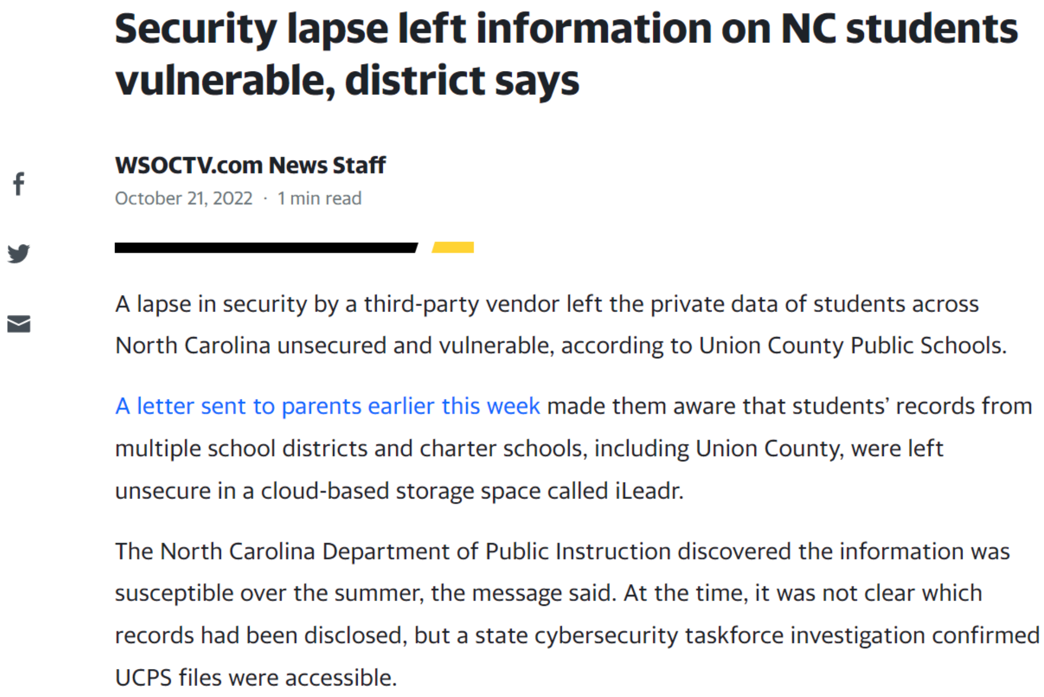
Business email compromise scams & direct deposit scams are preventable.

- Question everything
- Require a formal process for changes, including physical confirmation
- Ask IT to review before changes are made

Trend #5

#5: Third-Party Vendor Breaches



Security lapse left information on NC students vulnerable, district says

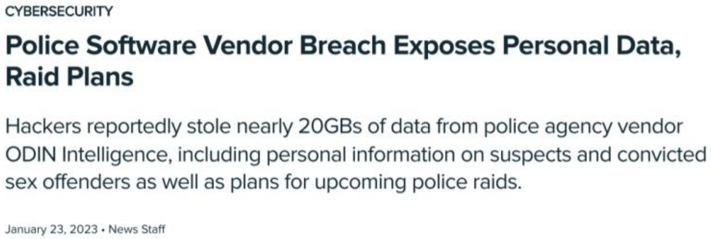
WSOCTV.com News Staff

October 21, 2022 · 1 min read

A lapse in security by a third-party vendor left the private data of students across North Carolina unsecured and vulnerable, according to Union County Public Schools.

A letter sent to parents earlier this week made them aware that students' records from multiple school districts and charter schools, including Union County, were left unsecure in a cloud-based storage space called iLeadr.

The North Carolina Department of Public Instruction discovered the information was susceptible over the summer, the message said. At the time, it was not clear which records had been disclosed, but a state cybersecurity taskforce investigation confirmed UCPS files were accessible.



CYBERSECURITY

Police Software Vendor Breach Exposes Personal Data, Raid Plans

Hackers reportedly stole nearly 20GBs of data from police agency vendor ODIN Intelligence, including personal information on suspects and convicted sex offenders as well as plans for upcoming police raids.

January 23, 2023 • News Staff

NC Breach Notification Law

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NC General Statutes Article 75, Chapter 2A

- Identity Theft Protection Act
- NCGS75-61(1) excludes government from the definition of "business" but….

Application of NCGS 75-65 to Governmental Entities

§ 132-1.10. Social security numbers and other personal identifying information.
(c1) If an agency of the State or its political subdivisions, or any agent or employee of a government agency, experiences a security breach, as defined in Article 2A of Chapter 75 of the General Statutes, the agency shall comply with the requirements of G.S. 75-65.

NC Breach Notification Law

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NC General Statutes Article 75, Chapter 2A

(10) "Personal information". – A person's first name or first initial and last name in combination with identifying information as defined in G.S. 14-113.20(b). Personal information does not include publicly available directories containing information an individual has voluntarily consented to have publicly disseminated or listed, including name, address, and telephone number, and does not include information made lawfully available to the general public from federal, state, or local government records.

G.S. 14-113.20(b). The term "identifying information" as used in this Article includes the following: (1) Social security or employer taxpayer identification numbers. (2) Driver's license, State identification card, or passport numbers. (3) Checking account numbers. (4) Savings account numbers. (5) Credit card numbers. (6) Debit card numbers. (7) Personal Identification (PIN) Code as defined in G.S. 14-113.8(6). (8) Electronic identification numbers, electronic mail names or addresses, Internet account numbers, or Internet identification names. (9) Digital signatures. (10) Any other numbers or information that can be used to access a person's financial resources. (11) Biometric data. (12) Fingerprints. (13) Passwords. (14) Parent's legal surname prior to marriage

Definition of Security Breach: NCGS 75-61(14)

- **§ 75-61(14) "Security breach".** – An incident of unauthorized access to and acquisition of unencrypted and unredacted records or data containing personal information where illegal use of the personal information has occurred or is reasonably likely to occur or that creates a material risk of harm to a consumer. Any incident of unauthorized access to and acquisition of encrypted records or data containing personal information along with the confidential process or key shall constitute a security breach. Good faith acquisition of personal information by an employee or agent of the business for a legitimate purpose is not a security breach, provided that the personal information is not used for a purpose other than a lawful purpose of the business and is not subject to further unauthorized disclosure. defines a security breach as “the unauthorized release of unencrypted or unredacted records or data containing personal information with corresponding names, such as a person’s first initial and last name.”

§ 75-65. Protection from security breaches

(a) Any business that owns or licenses personal information of residents of North Carolina or any business that conducts business in North Carolina that owns or licenses personal information in any form (whether computerized, paper, or otherwise) shall provide notice to the affected person that there has been a security breach following discovery or notification of the breach. The disclosure notification shall be made without unreasonable delay, consistent with the legitimate needs of law enforcement, as provided in subsection (c) of this section, and consistent with any measures necessary to determine sufficient contact information, determine the scope of the breach and restore the reasonable integrity, security, and confidentiality of the data system. For the purposes of this section, personal information shall not include electronic identification numbers, electronic mail names or addresses, Internet account numbers, Internet identification names, parent's legal surname prior to marriage, or a password unless this information would permit access to a person's financial account or resources.

§ 75-65. Protection from security breaches

(b) Any business that maintains or possesses records or data containing personal information of residents of North Carolina that the business does not own or license, or any business that conducts business in North Carolina that maintains or possesses records or data containing personal information that the business does not own or license shall notify the owner or licensee of the information of any security breach immediately following discovery of the breach, consistent with the legitimate needs of law enforcement as provided in subsection (c) of this section….

Data Breach
Burden of Notice

Contract Language to Include

Breach Notice/Cost Language

Breach Notification and Associated Costs: Where a breach or unauthorized release, as defined in NCGS 75-65 or in any other state or federal regulation, is attributed to a third-party vendor/contractor, the third-party entity shall pay for or promptly reimburse XXX entity for the full cost of the notifications, including any associated legal fees, either through the third party's cyber liability insurance provider or through their own entity funds.

COI Requirement

- RFP Requirement for All Software-Based Services, Vendors Supporting Systems, etc.

- Cyber Insurance: The contractor shall maintain cyber liability in the minimum amount of $1,000,000 per occurrence, including third-party coverage for incidents or associated impacts caused directly or indirectly by said vendor.

Insurance Coverage?

- Notice with Reservation of Rights
- Deny Claims for Out-of-Pocket Costs
- Need Indemnity in Contract Language
- Cloud Provider Risk Assessments via Insurance
  - Pre-existing conditions
- Security Requirements in Contracts
  - Evidence of SOC II Certification
  - Other attestations (use of State Vendor Readiness Assessment Report or similar tools)
  - Security Scorecard

What Can You Do To Protect Yourself and Your Organization?

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NCLGISA IT Strike Team Recommendations for Non-IT Staff

1. If you suspect ransomware, contact your IT department immediately! They should start severing all Internet-based connections asap.

2. Don’t turn off your computer/server, just disconnect it from the Internet (ethernet and wireless)

3. Do not try to stay up and “functional”, as it will allow for rapid, catastrophic proliferation across your networks and into any interconnections you might have with neighboring entities. ** No, you cannot just turn on your computer really quickly and insert a flash drive for those files you really need.

4. Use strong passwords (and unique ones) plus MFA (multifactor authentication) in your organization and personally.

5. Do not allow vendors to have open tunnels into your environment for remote support. Use a documented process for external access.

6. Do not use the same credentials for domain, system or software administration and your local accounts. Many of the recent breaches have involved compromised domain administrator credentials, which often are found to be the same as cached local administrator credentials.

7. Ask for immutable backups that are stored physically and virtually apart from the network for critical systems. After attacking the domain controller(s), most current variants go straight to encrypting your backups.

8. Determine what servers contain sensitive data (PHI, PII, financial data, CJIS data, etc) and keep this on file outside of the network.

9. Know your cyber-liability insurance policy well and have conversations with them prior to an event to determine their standard course of action (preferred vendors, etc).

10. Require user education for phishing messages and aggressive response to mitigate anyone who falls for phishing. Exposed credentials and malware downloads are part of the problem and can be limited with proper education.

11. Create a Continuity of Operations plan for your entity including defining who will serve as Incident Commander and drill it to make sure it works for your team!

12. Work with senior leadership to create a prioritization document for bringing departments/applications back online.

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