



Your data Your evidence!





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Passion for sharing knowledge about IT-security -  
This is my little contribution - **representing only me!**

# • Agenda



- Why collect data
- What is good evidence
- Prepare your DFIR plan
- Describe process for collecting
- Integrity of data
- Prepare to share

## ● Caveat

- I am **biased towards my old job!**  
“It’s also **what drives me** to this presentation”
- It’s not a promise, **its lessons learned**, based on my experience
- It’s **up to you to report** or not, im neutral in that sense.



# The Problem

The criminals have it too easy!

- The issue



- A lot of companies are **being attacked every day**
- It's **way too easy** for the criminals
- Compared to physical world, there is a difference in the amount prosecutions

# The Authorities - Ask before you report

**Forside / Anmeld kriminalitet**

Hvis du har været udsat for noget kriminelt, bør du anmeldte det til politiet.

Mange kriminalitetsformer kan du anmelde her på hjemmesiden. Andre skal du anmeldte ved at ringe til politets servicecenter på 112, ved at skrive (også via e-mail) eller ved personligt fremmøde på en politstation.

Ring altid til alarmcentralen på 112, hvis du har brug for akut udrykning.

- Indbrud**  
Anmeld indbrud (de private hjem, sommerhus, offentlige bygninger eller ubevogtede arbejdspladser) til politet.
- Vold og røveri**  
Anmeld vold (fysiske eller psykiske skader) og røveri (fysiske eller psykiske skader) til politet. Hvis du har været udsat for vold eller røveri, skal du altid ringe til politet.
- Hadforbrydelser**  
Hvis du har været udsat for en hadforbrydelse, som du mener kan have baggrund i fx din religion, etnicitet, hudfarve, seksualorientering, kønsidentitet, seksuel identitet, handicap eller et andet særligt kendetegn, skal du altid ringe til politet.
- Digitale seksualforbrydelser**  
Anmeld digitale seksualforbrydelser til politet, hvis du har været udsat for en digital seksualforbrydelse.
- Hacking**  
Anmeld ulovlig adgang til dine digitale enheder, fx computer eller mobiltelefon, eller til et net (DDoS-angreb).
- Tyveri og hærværk**  
Anmeld tyveri, cykeltyveri, butikstyveri, indbrud i bil eller anden form for tyveri og hærværk.
- Stalking, psykisk vold og vold i nære relationer**  
Anmeld stalking, hærværk, psykisk vold og vold i nære relationer til politet.
- Seksuualforbrydelser**  
Anmeld seksuelle overgreb og seksuelle overgreb til politet, eller til en af de to parter, eller til en af de to parter.
- Økonomisk svindel på nettet**  
Anmeld økonomisk svindel på nettet, fx svindel ved køb eller salg, misbrug af identitet, bedrøvelsesforsøg eller bedrøvelsesforsøg.
- Øre, vidner og pårørende**  
Hvis du har været udsat for en forbrydelse, og du har været udsat for en forbrydelse, og du har været udsat for en forbrydelse, og du har været udsat for en forbrydelse.
- Anmeld uberettiget adgang**  
Anmeld det, hvis nogen uden tilladelse har udført adgang til dine digitale enheder, fx computer eller mobiltelefon, en streamingtjeneste eller en social media konto - fx Facebook eller Netflix.

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Du kan også anmeldte ved at ringe 112 eller ved at møde op på en politstation.

Følgende kriminalitetsformer skal du ikke anmeldte her:

- Hvis du oplever, at der er forsvundet penge fra din bankkonto uden din viden, eller mistet, at nogen har haft uberettiget adgang til din internet, skal du anmeldte det som økonomisk svindel på nettet.

**POLITI**

Forside / Service og tilladelser / Bestil en betjent / **Bestil en it-ekspert til din virksomhed**

## Bestil en it-ekspert til din virksomhed

Du kan anmode politiet om at holde et oplæg for din brancheforening, erhvervsnetværk e.l. om it-sikkerhed for små og mellemstore virksomheder. Oplægget er et tilbud fra NC3 Erhverv, der er et landsdækkende virksomhedsrettet forebyggelseskoncept under Rigspolitiets Nationale Cyber Crime Center.

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**Ret dit samtykke**

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OM NC3ERHERV

- + **Hvad er NC3Erhverv?**
- + **Hvem er NC3Erhverv?**

Link = <https://politi.dk/anmeld-kriminalitet>

- Why the authorities?

- - Give the authorities the power to **investigate and prosecute as they are supposed to do**. Else cybercrime will continue!
  - We need to keep **politicians accountable and informed!** To make decisions going forward!

This will increase the **chance of an investigation and prosecution**

## Why collect data?

Kære ,

De har 2021 anmeldt afpresning via ransomware til politiet. I den forbindelse har vi brug for de nedenfor oplyste oplysninger for at kunne behandle Deres sag:

- Baggrundsbillede eller tekstfil, som gerningsmanden har lagt på computeren, hvor der angives kontaktoplysninger. Helst original format.
- 3 krypterede filer på max ca. 5 mb. Gerne .zip eller .7Z fil.
- Kopi af filer, programmer eller andet der ved gennemgang af serveren findes efterladt af gerningsmændene. Fx krypteringssoftwaren. Gerne som .zip eller .7Z fil.
- Hvis det konstateres at adgangen til forurettedes computer var gennem RDP (Remote Desktop Port), så hvis muligt en kopi af hele loggen for den kompromitterede RDP port.
- Kopi af spor som gerningsmændene har efterladt i deres forsøg på at fremme deres brugerstatus.

Hvis der eventuelt skulle være andet på computerne/serverne, som I vurderer kunne have interesse for sagen, så et kopi af dette.

- Dokumentation for køb af Bitcoins i form af udvidet betalings- / overførselskvittering.
- Dokumentation for overførsel af de oplyste BTC sammen med dokumentation for afsender og modtageradresser.
- Redegørelse for hvorvidt forurettede eller dennes repræsentant har rettet henvendelse til kryptobørser eller lignende med henblik på indsigelse. I bekræftende fald dokumentation herfor.
- Mailkorrespondance med gerningsmanden (vedhæftet mails fra gerningsmanden fra første mail-modtager, så mailheaderen kan udlæses).
- Dekrypteringsfiler typisk decrypt.exe, som blev benyttet til at låse filerne op.

Det hele må gerne samles i en .zip eller .7Z fil.

**Det er politiets anbefaling, at der ikke betales løsesum.**

- Der er mulighed for at finde dekrypteringsværktøjer på [NoMoreRansom.org](https://nomoreransom.org), der måske kan dekryptere jeres filer. Alternativt kan harddisken gemmes, da siden opdateres løbende.

Dokumenterne bedes i én sammenfattende e-mail sendt hurtigst muligt og senest inden 14 dage til adressen: [KBH-LCIK-sek3@politi.dk](mailto:KBH-LCIK-sek3@politi.dk). 4 emnefeltet bedes De skrive journalnummeret: 01 LC.

Når politiet modtager dokumenterne, vil de blive vedlagt Deres sag. Såfremt De har spørgsmål, bedes De rette henvendelse på e-mail: [KBH-LCIK@politi.dk](mailto:KBH-LCIK@politi.dk).

Såfremt politiet ikke modtager oplysningerne, kan det betyde, at politiet ikke har mulighed for at efterforske sagen.

Side 1

**Såfremt politiet ikke modtager oplysningerne, kan det betyde, at politiet ikke har mulighed for at efterforske sagen.**

## ● Expectations

When a crime has been committed, the **police begin investigating the case if there are clues or other information that could lead to the case being solved**. Normally, the police start the investigation by questioning the person or persons who know or have seen something relevant to the case.

There may also be **technical clues that the police must investigate**. It can be fingerprints, DNA traces or recordings **from video surveillance**.

If the police believe that there are **reasonable grounds to suspect a particular person, the police will charge him or her with the crime**. When the investigation is over, the prosecutor's office decides what to do next.

Source: <https://anklagemyndigheden.dk/da/anmeldelse-og-efterforskning>

## ● Police task

○ The task of the police is to maintain **security, peace and order** - to monitor that the laws are observed and to **take action against offenses by investigation** and **prosecution**. The police also have administrative tasks, such as issuing weapon permits. In addition, the police also have tasks within **total defense in Denmark**.

Source: <https://www.forsvaret.dk/da/opgaver/nationale-opgaver/Totalforsvaret/>

Source: <https://www.justitsministeriet.dk/ministeriet/justitsvaesenet/politi-2/>



# Evidence

What is good evidence?

- “Anonymous”

The best evidence,  
is the evidence you’ve  
got!

## ● This leads to forensics and what is this?

“methods of solving crimes, involving examining the objects or substances that are” involved in the crime

“Forensic is used to describe the work of scientists who examine evidence in order to help the police solve crimes.”

“However, forensics is not just important in the courtroom; forensic evidence needs to be found before any scientific discussion in court can take place. This evidence is found by forensic scientists by performing certain jobs in fields such as chemistry, biology, psychology and even mathematics.”

Source: <https://dictionary.cambridge.org/dictionary/english/forensic>

Source: <https://www.merriam-webster.com/dictionary/forensic>

Source: <https://www.collinsdictionary.com/dictionary/english/forensic>

Source: <https://www.crimemuseum.org/crime-library/forensic-investigation/definition-of-forensics/>

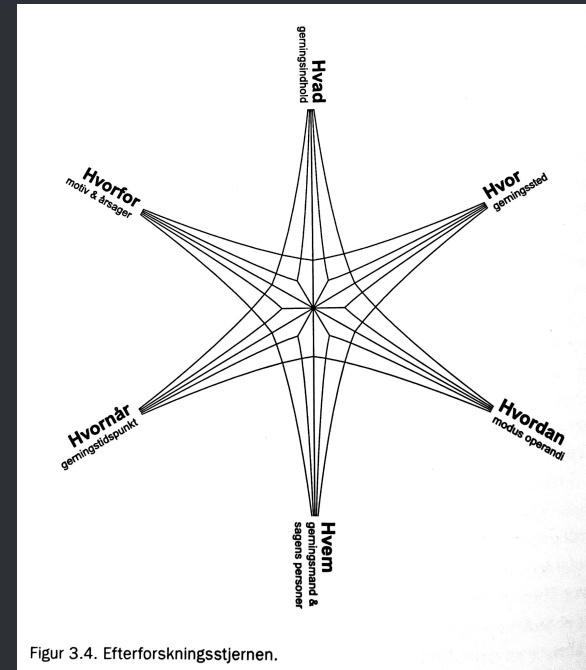
## ● What is a good piece of evidence?

- Data from more sources that point in the same direction  
(Triangulation)
- Data must prove the point  
(authenticity )
- Data that comes out of your observations  
(artefacts from systems, malware analysis ... Your observables!)
- Data that show what happened and prove the point  
(A Well description of what happened and where its recorded)
- Data have to be admissible  
(Collected using legal methods)

## Think like the Police

### Investigation star

- What
- Where
- How
- Who
- When
- Why



Source:

[https://www.saxo.com/dk/om-at-opdage\\_karl-ask-adam-diderichsen-ivar-a-fahsing-camilla-hald-vincent-f-hendricks-bjarke-viskum-kira\\_pdf\\_9788759322277](https://www.saxo.com/dk/om-at-opdage_karl-ask-adam-diderichsen-ivar-a-fahsing-camilla-hald-vincent-f-hendricks-bjarke-viskum-kira_pdf_9788759322277)



# Prepare

Your DFIR plan and readiness

- Prepare, collect, conquer

- - Prepare for **collecting the data**
  - Describe your process
  - Make it a part of your DFIR plan
  - Spending a little extra, goes a long way
  - Assign a person to be responsible

- Test your tools, know your capability

- - Knowing tools and their usage and know its limitations
  - Make a process for data collection across the business
  - Do you have the necessary setup for analysis?  
(Hardware, network, software etc.)

# Examples of escalation/collection

Escalation chart - severity escalation

Escalation Chart with Examples (This table is not inexhaustible )

| severity  | event  | action   | Capacity  | Report to authorities  | Preparation   |
|---|--|--|---|--|---|
| level 1 (Low)   | <ul style="list-style-type: none"> <li>potentially unwanted programs (PUP)</li> <li>warning banners</li> <li>clean alerts from antimalware solution</li> <li>Adware</li> </ul>   | <ul style="list-style-type: none"> <li>Delete the files</li> <li>Remove the software / service</li> </ul>  | <ul style="list-style-type: none"> <li>Normal operations</li> <li>Register the event</li> </ul>   | no   | <ul style="list-style-type: none"> <li>Normal service and follow up of Antimalware services.</li> </ul>   |
| level 2 (mid)   | <ul style="list-style-type: none"> <li>Phishing</li> <li>malware detected and deleted</li> <li>Macro viruses</li> </ul>  | <ul style="list-style-type: none"> <li>Delete the files</li> <li>Remove the software / service</li> <li>Maybe look for online information.</li> </ul>  | <ul style="list-style-type: none"> <li>As level 1</li> <li>Escalate if more occurrences are detected</li> </ul>   | <ul style="list-style-type: none"> <li>As information only. Report, don't expect any investigation</li> </ul>  | <ul style="list-style-type: none"> <li>Normal service and follow up of Antimalware services.</li> <li>validated and tested, response plan</li> </ul>  |
| level 3 (High severity and low spread)                            | <ul style="list-style-type: none"> <li>Copyright infringement</li> <li>malware partially detected</li> <li>Passwords leaks with e-mail</li> <li>Spear phishing and data not delivered</li> <li>Attempts to escalate privileges</li> <li>Attempts of lateral movement</li> <li>Usage of CVE 7+ vulnerabilities</li> </ul> | <ul style="list-style-type: none"> <li>Escalate the Incident Response plan accordingly</li> <li>Analyze the event to see what is the intention.</li> <li>Set up monitoring for the events</li> <li>Prepare for further events and inform management</li> <li>Monitor closely for activity</li> </ul> | <ul style="list-style-type: none"> <li>As level 2</li> <li>Collection of data with integrity and timestamps (maybe Forensic less sound)</li> <li>Carefully describe your process of evidence collection.</li> </ul>                                   | <ul style="list-style-type: none"> <li>Yes, share data and the identification findings.</li> <li>Get case/report ID.</li> <li>Get contact at the police and get JNR number (IT-engineer at NSK/NC3)</li> </ul>   | <ul style="list-style-type: none"> <li>The above, including below</li> <li>Have updated and tested Incident Response plan</li> <li>Forensic capability, and les forensic ways of data collection</li> </ul> |
| level 4 (Critical, high impact - high spread - business critical) | <ul style="list-style-type: none"> <li>Zero days</li> <li>APT</li> <li>Malware not detected and activated</li> <li>Spear phishing and data delivered</li> <li>Services have been breached</li> <li>Accounts have been escalated</li> <li>Usage of CVE 7+ vulnerabilities</li> </ul>                                      | <ul style="list-style-type: none"> <li>Escalate the Incident Response plan accordingly</li> <li>Create a communication plan if needed. (specially of company deliveries to the community)</li> <li>Analyze the events for the intention.</li> <li>Prepare 3<sup>rd</sup> party</li> </ul>            | <ul style="list-style-type: none"> <li>As level 4</li> <li>Designate responsibility to file responsible.</li> <li>Report to authorities (Get contact to appropriate level (NSK/NC3))</li> <li>Physical collect data from media if possible</li> </ul> | <ul style="list-style-type: none"> <li>Yes, share data and the identification findings.</li> <li>Get case/report ID</li> <li>Get contact at the police and get JNR number (IT-engineer at NSK/NC3)</li> <li>Prepare court case (if needed and</li> </ul> | <ul style="list-style-type: none"> <li>Major incident plan.</li> <li>Secondary communications channels</li> </ul>   |

# Examples of escalation/collection

| A1 | Escalation Chart                           |  |                                  |                               |         |          |        |    |                 |           |                |                       |                    |                  |          |  |
|----|--|--|----------------------------------|-------------------------------|---------|----------|--------|----|-----------------|-----------|----------------|-----------------------|--------------------|------------------|----------|--|
|    | A  | B                                      | C                                | D                             | E       | F        | G      | H  | I               | J         | K              | L                     | M                  | N                | O        |  |
| 1  | Escalation Chart                           |  |                                  |                               |         |          |        |    |                 |           |                |                       |                    |                  |          |  |
| 2  | Event                                      | Action                                 | Capacity                         | Preparation capability        | Man lab | auto lab | Not WB | WB | Remote analysis | Isolation | Integrity calc | Report to authorities | Inform authorities | Sample Isolation | Severity |  |
| 3  | potentially unwanted programs (PUP)        | remove program                         | monitor for recurrence           | Corporate image               |         |          |        |    | x               |           | x              |                       |                    |                  | 1        |  |
| 4  | warning banners                            | remove program                         | monitor for recurrence           | Corporate image               |         |          |        |    | x               |           | x              |                       |                    |                  | 3        |  |
| 5  | clean alerts from antimalware solution     | remove program                         | monitor for recurrence           | Corporate image               |         |          |        |    | x               |           | x              |                       |                    |                  | 3        |  |
| 6  | Adware                                     | remove program                         | monitor for recurrence           | Corporate image               |         |          |        |    | x               |           | x              |                       |                    |                  | 4        |  |
| 7  | Phishing                                   | Rely on Spamfiltering                  | monitor for recurrence           | Corporate image               |         |          |        |    | x               |           | x              |                       |                    |                  | 5        |  |
| 8  | Spear Phishing                             | analyse threat                         | analyze with detached system     | Lab                           |         |          | x      |    | x               |           | x              | x                     | x                  | x                | 8        |  |
| 9  | malware detected and deleted               | re-install system                      | monitor for recurrence           | Corporate image               |         | x        |        |    | x               | x         | x              |                       |                    |                  | 2        |  |
| 10 | malware partially detected                 | re-establish system from backup        | monitor for recurrence           | Corporate image               |         | x        |        |    | x               | x         | x              |                       |                    |                  | 7        |  |
| 11 | malwarebehaviour and not detected          | re-install system                      | monitor for recurrence           | Corporate image               | x       | x        |        |    | x               | x         | x              |                       |                    | x                | 10       |  |
| 12 | Macro viruses                              | re-install system                      | monitor for recurrence           | Corporate image               |         |          |        |    | x               |           | x              |                       |                    | x                | 8        |  |
| 13 | Copyright infringement                     | Withhold HW ans secure user traces     | physical secure evidence         | Writeblocker                  | x       |          | x      |    | x               |           | x              |                       |                    | x                | 10       |  |
| 14 | Passwords leaks with e-mail                | Change passwords and enable MFA        | monitor for recurrence           | Awareness plan                |         |          | x      |    | x               |           | x              |                       |                    |                  | 5        |  |
| 15 | Spear phishing and data not delivered      | Change passwords and enable MFA        | monitor for recurrence           | Awareness plan                |         |          | x      |    | x               |           | x              |                       |                    |                  | 4        |  |
| 16 | Attempts to escalate privileges            | Determine MO and escalate to IR        | DFIR plan                        | Forensic analysis             | x       |          | x      |    | x               |           | x              | x                     | x                  | x                | 9        |  |
| 17 | Attempts of lateral movement               | Determine MO and escalate to IR        | DFIR plan                        | Forensic analysis             | x       |          | x      |    | x               |           | x              | x                     | x                  | x                | 10       |  |
| 18 | Usage of CVE 7+ vulnerabilities            | re-establish system from backup        | inform senior management of risk | Corporate image + patch       |         |          | x      |    | x               |           | x              |                       |                    | x                | 9        |  |
| 19 | CVE 7+ vulnerabilities identified          | Create Risk analysis                   | governance plan                  | Forensic analysis and monitor | x       |          | x      |    | x               |           | x              |                       |                    |                  | 6        |  |
| 20 | Rootkits detected on system                | Determine MO and escalate to IR        | datacollect and re-install       | Forensic analysis and monitor | x       |          | x      |    | x               |           | x              | x                     | x                  | x                | 9        |  |
| 21 | Remote Access Trojan (RAT)                 | Determine MO and escalate to IR        | DFIR plan                        | Forensic analysis and monitor | x       |          | x      |    | x               |           | x              | x                     | x                  | x                | 10       |  |
| 22 | Zero days (internal systems/network)       | Create Risk analysis                   | governance plan                  | vulnerability scanner         |         |          | x      |    | x               |           | x              |                       |                    |                  | 5        |  |
| 23 | Zero days (Facing Internet)                | Determine MO and escalate to IR        | DFIR plan                        | Forensic analysis and monitor | x       |          | x      |    | x               |           | x              |                       |                    |                  | 10       |  |
| 24 | APT  | Determine MO and calculate risk        | restore from backup              | Forensic analysis and monitor | x       |          | x      |    | x               |           | x              | x                     | x                  | x                | 10       |  |
| 25 | unpatched systems                          | Roll into patch mangement              | governance plan                  | Monitor activity              |         |          | x      |    | x               |           | x              |                       |                    |                  | 5        |  |
| 26 | Malware not detected and activated         | Determine action and severity          | DFIR plan                        | Forensic analysis and monitor |         |          | x      |    | x               |           | x              |                       |                    | x                | 10       |  |
| 27 | Spear phishing and data delivered detected | Determine MO and calculate risk        | inform senior management of risk | Monitor activity              | x       | x        | x      | x  | x               | x         | x              | x                     | x                  | x                | 10       |  |
| 28 | Services have been breached                | Analyze logs and peripherals - restore | DFIR plan                        | Corporate image               |         |          | x      |    | x               |           | x              |                       |                    | x                | 10       |  |
| 29 | Accounts have been escalated               | Determine MO and escalate to IR        | DFIR plan                        | Forensic analysis and monitor |         |          | x      |    | x               |           | x              | x                     | x                  | x                | 8        |  |
| 30 | Targeted attacks (unsuccessful)            | Determine MO and calculate risk        | inform senior management of risk | Forensic analysis and monitor | x       | x        | x      |    | x               |           | x              |                       |                    | x                | 7        |  |
| 31 | Targeted attacks (successful)              | Determine MO and escalate to IR        | DFIR plan                        | Forensic analysis             | x       | x        | x      |    | x               | x         | x              | x                     | x                  | x                | 10       |  |
| 32 | Insider threats or paid actors             | Determine MO and escalate to IR        | DFIR plan                        | Forensic analysis             | x       |          | x      | x  | x               |           | x              | x                     | x                  | x                | 10       |  |
| 33 | EOL software (Internal)                    | Create Risk analysis                   | governance plan                  | vulnerability scanner         |         |          | x      |    | x               |           | x              |                       |                    |                  | 5        |  |
| 34 | EOL software (external)                    | Determine MO and calculate risk        | inform senior management of risk | vulnerability scanner         |         |          | x      |    | x               |           | x              |                       |                    |                  | 8        |  |
| 35 | EOL hardware                               | Create Risk analysis                   | governance plan                  | vulnerability scanner         |         |          | x      |    | x               |           | x              |                       |                    |                  | 4        |  |
| 36 | Legacy systems                             | Create Risk analysis                   | governance plan                  | vulnerability scanner         |         |          | x      |    | x               |           | x              |                       |                    |                  | 5        |  |
| 37 | User violated AUP                          | Determine MO and escalate accordingly  | warn and inform (monitor)        | Plan from HR                  | x       | x        | x      | x  | x               | x         | x              | x                     | x                  | x                | 7        |  |
| 38 | User violated AUP intentional              | Determine MO and escalate accordingly  | datacollect                      | Plan from HR                  | x       | x        | x      | x  | x               | x         | x              | x                     | x                  | x                | 10       |  |



# Prepare

your tools and know your capabilities

- Special tools



- Writeblock capability
- Data collection to **one place!**  
(and of course backup the data)
- Forensic software



# Collect

Process for good collection



## Plan your process

- Delegate data responsibility to assigned personel
- Have addendum for DFIR plan/checklist
  - Where data was collected
  - Who provided the data
  - Time and date
  - With / without writeblocker

**SIR - Addendum**

Bilag: SIR Tjekliste addendum 8. oktober 2022

BILAG # til SIR tjeklisten Sag: \_\_\_\_\_  
Artefakt fund fund: \_\_\_\_\_  
Hvilken Dato / tid blev du præsenteret for artefakten? Dato: \_\_\_\_\_

Hvem sikrede artefakten og hvordan ? Navn: \_\_\_\_\_  
☐ Skrivebeskyttet?  
☐ Ikke skrivebeskyttet?

Hvor blev artefakterne sikret til ? (Disk, USB, Drev mv. ) \_\_\_\_\_

Hvordan blev artefakten identificeret og af hvem? \_\_\_\_\_

Hashværdi /er? (Filnavn og værdi (sha1, md5, mv. )) \_\_\_\_\_

Hvilke tools blev anvendt og hvilken version? \_\_\_\_\_

Andre observationer \_\_\_\_\_

Kontakt oplysninger til brugeren, såfremt der måtte være spørgsmål

Tlf: \_\_\_\_\_

E-mail: \_\_\_\_\_

Brugernavn: \_\_\_\_\_

Kontor: \_\_\_\_\_

Bygning: \_\_\_\_\_

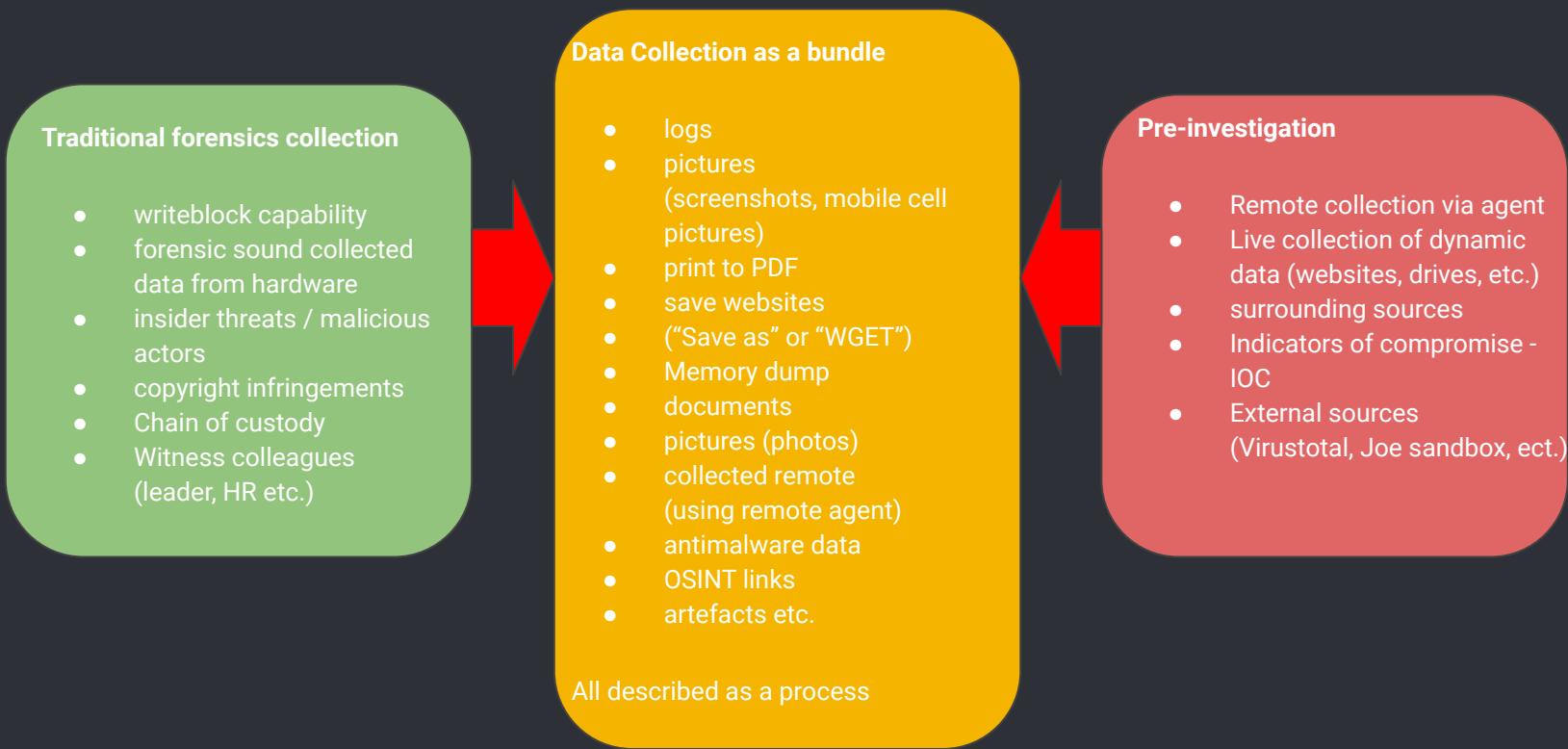
- Forensic capability

- - Writeblock capability  
(HW or SW)
  - Know your environment of hardware  
(IDE, SATA, M.2, PCI-E, USB, SD etc.)
  - If needed describe your “chain of custody”  
(Have a safe physical storage or monitored room)

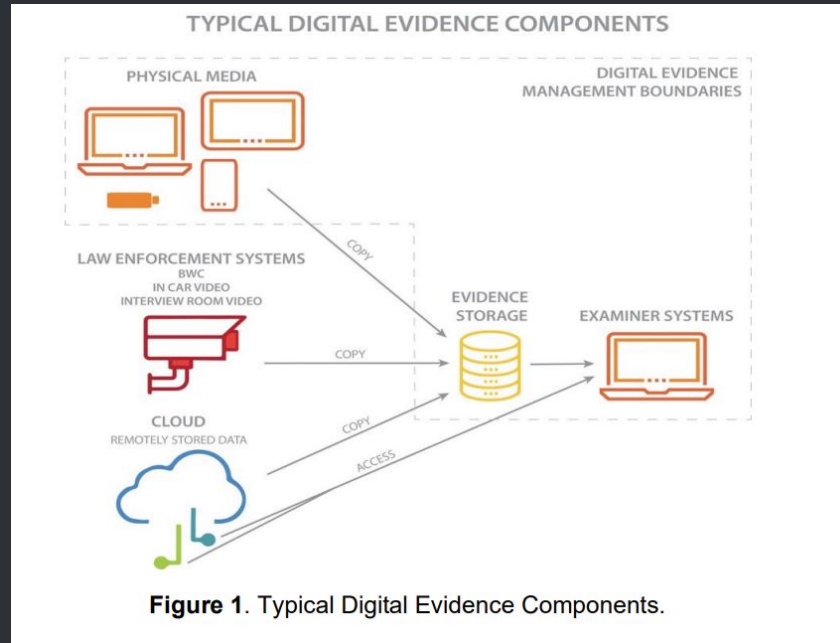
- Forensic data collection

- - Know your environment for datasources
    - Cloud, NAS, server, endpoint, network etc.
    - Website  
(in case of copyright)
  - Have tools at your aid  
(Forensic tools like Magnet Cyber, FTK, Autopsy, cybertriage etc)
  - Fx Memory Dump capability  
(Magnet ramdump, dumpit, FTK, Ram Capture etc. )
  - Identify your data, your artefact smoking gun

## Decide your capability



## Decide your capability



**Figure 1.** Typical Digital Evidence Components.

Source: <https://nvlpubs.nist.gov/nistpubs/ir/2022/NISTIR.8387.pdf>

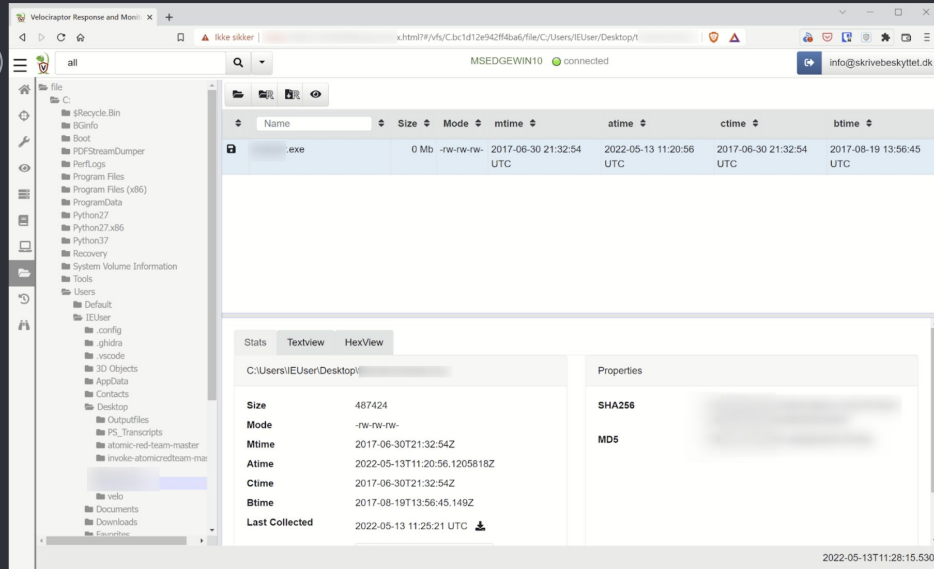
And: <https://www.nist.gov/forensic-science/interdisciplinary-topics/evidence-management>



# Remote collect

It's not easy from afar

## Example - Velociraptor



The screenshot displays the Velociraptor Response and Monitor web interface. The left sidebar shows a file tree with various system directories. The main panel shows a table of files, with the selected file's details displayed below.

| Name | Size | Mode       | mtime                   | atime                   | ctime                   | btime                   |
|------|------|------------|-------------------------|-------------------------|-------------------------|-------------------------|
| .exe | 0 Mb | -rw-rw-rw- | 2017-06-30 21:32:54 UTC | 2022-05-13 11:20:56 UTC | 2017-06-30 21:32:54 UTC | 2017-08-19 13:56:45 UTC |

Below the table, the file's properties are shown:

Size: 487424  
Mode: -rw-rw-rw-  
Mtime: 2017-06-30T21:32:54Z  
Atime: 2022-05-13T11:20:56.1205818Z  
Ctime: 2017-06-30T21:32:54Z  
Btime: 2017-08-19T13:56:45.149Z  
Last Collected: 2022-05-13 11:25:21 UTC

SHA256: [redacted]  
MD5: [redacted]





# Integrity

Freeze time

- Integrity is your file DNA

- - Use good HASH like SHA256 to avoid hash collision
  - Timestamps from the “snapshot”
  - Describe the prerequisites of the collection
  - Containerize the data, and turn on writeblock
  - Make it easy to understand the data and describe it

## Example of secure integrity

Case-24052022-Incident\_unwelcome\_guests

Machine-PC23455\_user\_arne@virk.dk

Machine-PC27255\_user\_lise@virk.dk

Machine-PC45455\_user\_vibs@virk.dk

Server-SV-App234-DK-webserver

| Machine-PC23455_user_arne@virk.dk      |                  |                       |           |  |
|--|------------------|-----------------------|-----------|--|
| Navn                                   | Ændringsdato     | Type                  | Størrelse |  |
| File1.pptx                             | 23-05-2022 20:27 | Microsoft PowerPo...  | 0 KB      |  |
| File2.pub                              | 23-05-2022 20:27 | Microsoft Publishe... | 59 KB     |  |
| File3.pub                              | 23-05-2022 20:26 | Microsoft Publishe... | 59 KB     |  |
| File4.docx                             | 23-05-2022 20:26 | Microsoft Word-d...   | 0 KB      |  |
| File5.docx                             | 23-05-2022 20:26 | Microsoft Word-d...   | 0 KB      |  |
| File6.rtf                              | 23-05-2022 20:26 | RTF-format            | 1 KB      |  |
| File7.xlsx                             | 23-05-2022 20:28 | Microsoft Excel-re... | 7 KB      |  |
| HASH_Machine-PC23455_user_arne@virk.dk | 23-05-2022 20:24 | Tekstdokument         | 1 KB      |  |

121CF9D2076962FD7D84A67129421915E626E59FB9D2EC8F89E35C7441553E6A App\AppInfo\File1  
573CED9FB3B5DBD183EF144532F3D36CB7D7EF444DC563B7243298DB2359E2DB App\AppInfo\File2  
F17B6E607BFB06E03551AECE1BC928C0A9E80A42AD12CBE84FC5220145F6225 App\AppInfo\File3  
C2048C3343F7837E43887D7AADE05411C165E796DFB82B0CF42438D50810FAE2 App\AppInfo\File4  
AE0EEF67EDF75DD9C15E0C2B5653C8628AD42DED2BA0495F9A68E55E439AAD42 App\AppInfo\File5  
2C101D62FFE213264CD69DA2118BC1735F2002BAD19C701937E046785BA71570 App\AppInfo\File6  
1EBED2D9CD92376A0A27EEBC8C6C54C371DDDB9F92E7FFFAE878EFCDC8B6059 App\AppInfo\File7

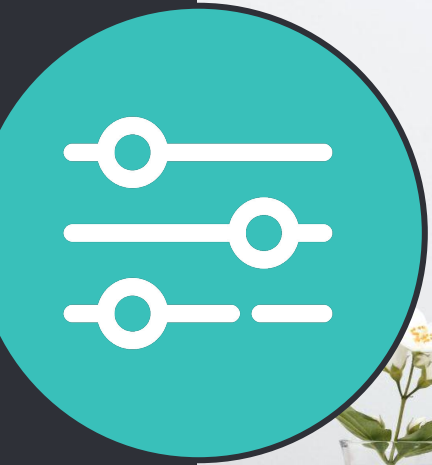
Machine-PC23455\_user\_arne@virk.dk

Machine-PC27255\_user\_lise@virk.dk

Machine-PC45455\_user\_vibs@virk.dk

Server-SV-App234-DK-webserver

Machine-PC23455\_user\_arne@virk.dk\_2361561673F42360C0431033D379D57C800E64FBB83465D042F764003C165356.zip



- Do we need to share?

- - Reporting to authorities (datatilsynet or police)
  - Do we have cloud sharing capability
    - Encryption
    - End share date
    - Password for data
    - One time download (fx boxcryptor)
  - **Remember it's your vulnerable moments**



# Learn

From your data

- Internal awareness

- - Can we use the material for training new personal?
  - Can we use the data to create awareness for C-level and users in the business?
  - We got a “free pentest” use it to your advantage ;)
  - Adjust your readiness



# Expectations

To the authorities - an alignment

## Example of expectation - gandcrab ransomware (approx 3 years)

Europol facilitated the information exchange, supported the coordination of operation GoldDust and provided operational analytical support, as well as cryptocurrency, malware and forensic analysis. During the action days, Europol deployed experts to each location and activated a Virtual Command Post to coordinate the activities on the ground. The international cooperation enabled Europol to streamline victim mitigation efforts with other EU countries. These activities prevented private companies from falling victim to Sodinokibi/REvil ransomware.

### GoldDust' links to GandCrab

Since 2018, Europol has supported a Romanian-led investigation which targets the GandCrab ransomware family and involved law enforcement authorities from a number of countries, including the United Kingdom and the United States. With more than one million victims worldwide, GandCrab was one of the world's most prolific ransomware families. These joint law enforcement efforts resulted in the release of three decryption tools through the No More Ransom project, saving more than 49 000 systems and over €60 million in unpaid ransom so far. The investigation also looked at the affiliates of GandCrab, some of whom are believed to have moved towards Sodinokibi/REvil. Operation GoldDust was also built up on leads from this previous investigation targeting GandCrab.

**Source:** <https://www.europol.europa.eu/media-press/newsroom/news/five-affiliates-to-sodinokibi/revil-unplugged>

## ● Example of expectation - Antwerp attack (about 2 years)

The hacking took place over a two-year period to June 2013 but appears to have come to an end after police arrested 15 people and seized computer equipment, drugs, firearms — including a machine gun — and a substantial amount of cash in raids in Belgium and the Netherlands.

### **Vanishing containers**

The attack on the port of Antwerp is thought to have taken place over a two-year period from June 2011.

Prosecutors say a Dutch-based trafficking group hid cocaine and heroin among legitimate cargoes, including timber and bananas shipped in containers from South America.

Source: <https://www.tradewindsnews.com/weekly/how-hackers-attacked-the-port-of-antwerp/1-1-342065> (paywall)

Source : <https://www.bbc.com/news/world-europe-24539417>

## Example of expectation - Silk road missing BTC (about 10 years)

"For almost ten years, the whereabouts of this massive chunk of missing Bitcoin had ballooned into an over \$3.3 billion mystery," [commented U.S. Attorney Damian Williams](#).

"Thanks to state-of-the-art cryptocurrency tracing and good old-fashioned police work, law enforcement located and recovered this impressive cache of crime proceeds."

Source:

[https://www.bleepingcomputer.com/news/security/us-unmasks-hacker-who-stole-50-000-bitcoins-from-silk-road/?utm\\_source=pocket\\_saves](https://www.bleepingcomputer.com/news/security/us-unmasks-hacker-who-stole-50-000-bitcoins-from-silk-road/?utm_source=pocket_saves)

## Example of expectation - sexual child exploitation case (over 2 years)

RETEN I RANDERS



**D O M**

afsagt den 27. november 2017

Retten nr. 5-600/2017  
Politiets nr. 4200-72386-00004-15

Anklagemyndigheden  
mod  
Tiltalte  
Født den Dato 1 1960

Der har medvirket domsmænd ved behandlingen af denne sag.

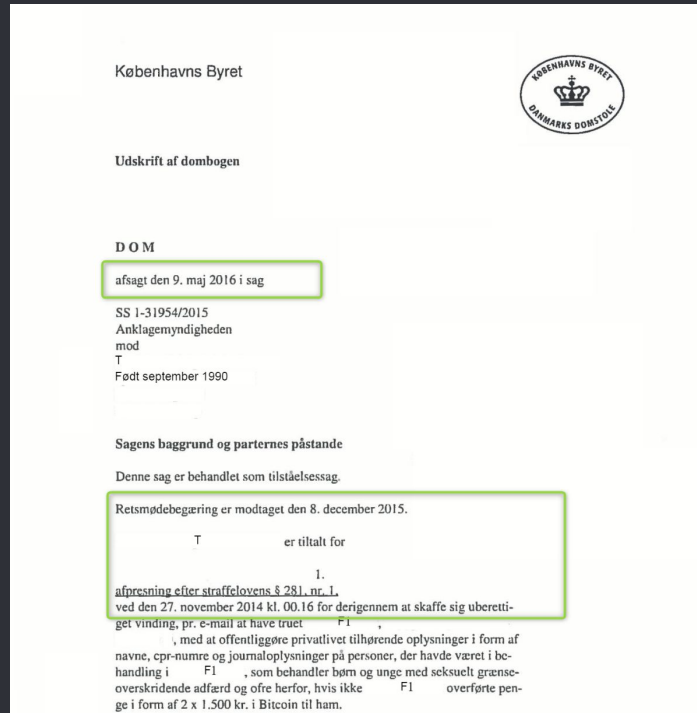
Anklageskrift er modtaget den 17. februar 2017.

Tiltalte er tiltalt for overtrædelse af

straffelovens § 235, stk. 1 og 2, udbredelse og besiddelse af børnepornografi, ved den 24. september 2015 ca. kl. 8.45 på Adresse 1  
■, Randers C, at have været i besiddelse af 3.091 pornografiske billeder og 2.643 pornografiske filmsekvenser med personer under 18 år, ligesom han i perioden fra den 14. december 2012 til den 23. september 2015 på internettet via fildelingsprogrammet "eMule" distribuerede i alt 9 pornografiske billeder og 3.492 pornografiske filmsekvenser med personer under 18 år.

Source: <https://domsdbasen.dk/webapi/api/Case/document/download/content/1126>

## Example of expectation - Extorsion (over 3 years)



Source:

<https://vidensbasen.anklagemyndigheden.dk/h/6dfa19d8-18cc-47d6-b4c4-3bd07bc15ec0/VB/85a1e29e-7b81-4a5d-b0aa-0373050353c0?showExact=true>



# Summarize

A few notes at the end

- Summarize - environment

- 1. Know you environment of log / data sources
  2. Know the capability of the above
  3. Know your analysis capability
  4. Know your plan and tools for the job
  5. Know your process for collecting
  6. Know your actions (reporting to authorities, vendors, peers etc )
  7. Test all of the above

- Summarize - process

- - Describe the task and tool
  - Describe the timeframe
  - Describe what you did
    - Maybe record what you did (screenshot / screencast)

The ultimate test to this, is court. **All cases are different. Do your best and succeed!**

- The Master Goal

○ Better evidence, for a chance of **investigation** and bringing the **perpetrators to justice!**

- Questions



A thin vertical line runs down the left side of the slide, with a small open circle positioned on it.

Thanks!  
Happy huntin'