One piece of the puzzle: Computational limits and opportunities of anonymity for whistleblower protection

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Where is whistleblowing happening ?

Public Sector
- Admin (corruption)
- Secret Services
- Military
- Law enforcement

Private Sector
- Insider trading
- Creative book keeping
- Abuse of power

CIF Seminar, 1 Feb 2022

What makes these different?

Public Sector
- Preservation of power

Private Sector
- Monetary advantage
  - Company
  - individual

Why is whistle-blowing important?

‘The Enron of Germany’: Wirecard scandal casts a shadow on corporate governance

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KEY POINTS

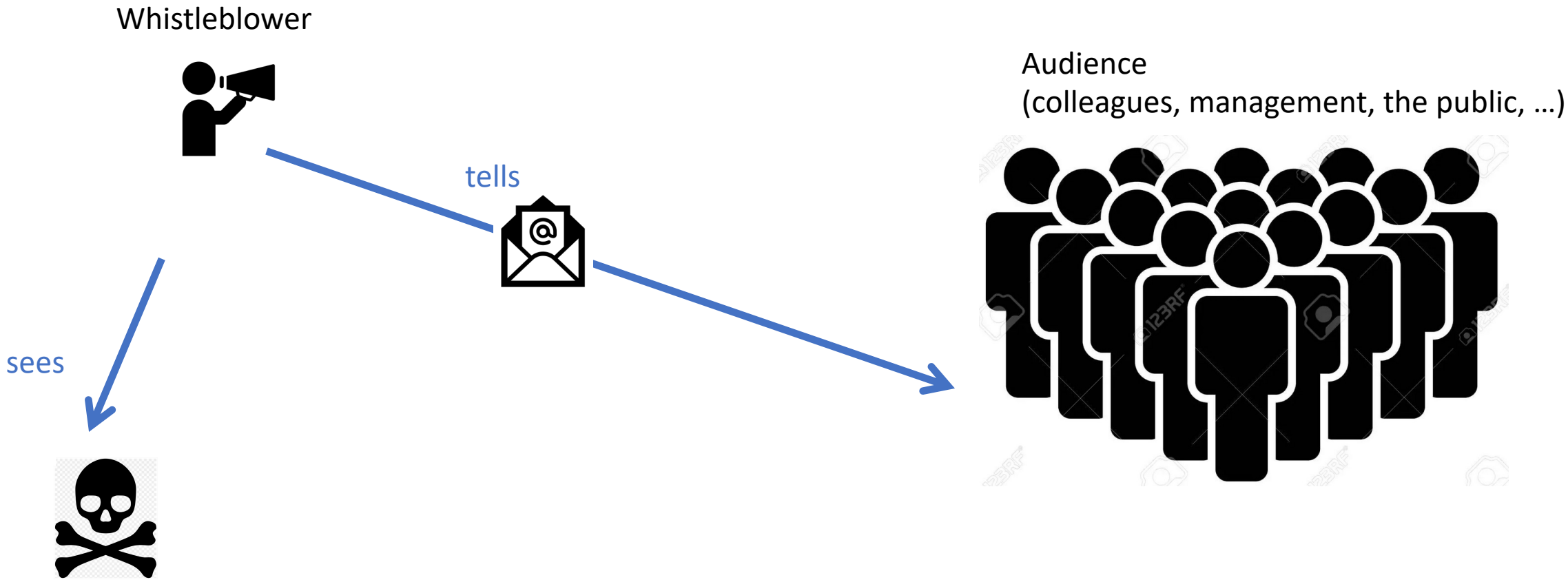
- The Wirecard accounting scandal has raised fresh questions about corporate governance, with some experts calling it the “Enron of Germany.”
- German financial regulator BaFin has come under fire for its handling of the situation, with the government now calling for regulatory reform.
- There are also questions about why EY, Wirecard’s auditor, didn’t pick up on accounting irregularities that date back years.

Retaliation prevents whistleblowing; what encourages whistleblowing?

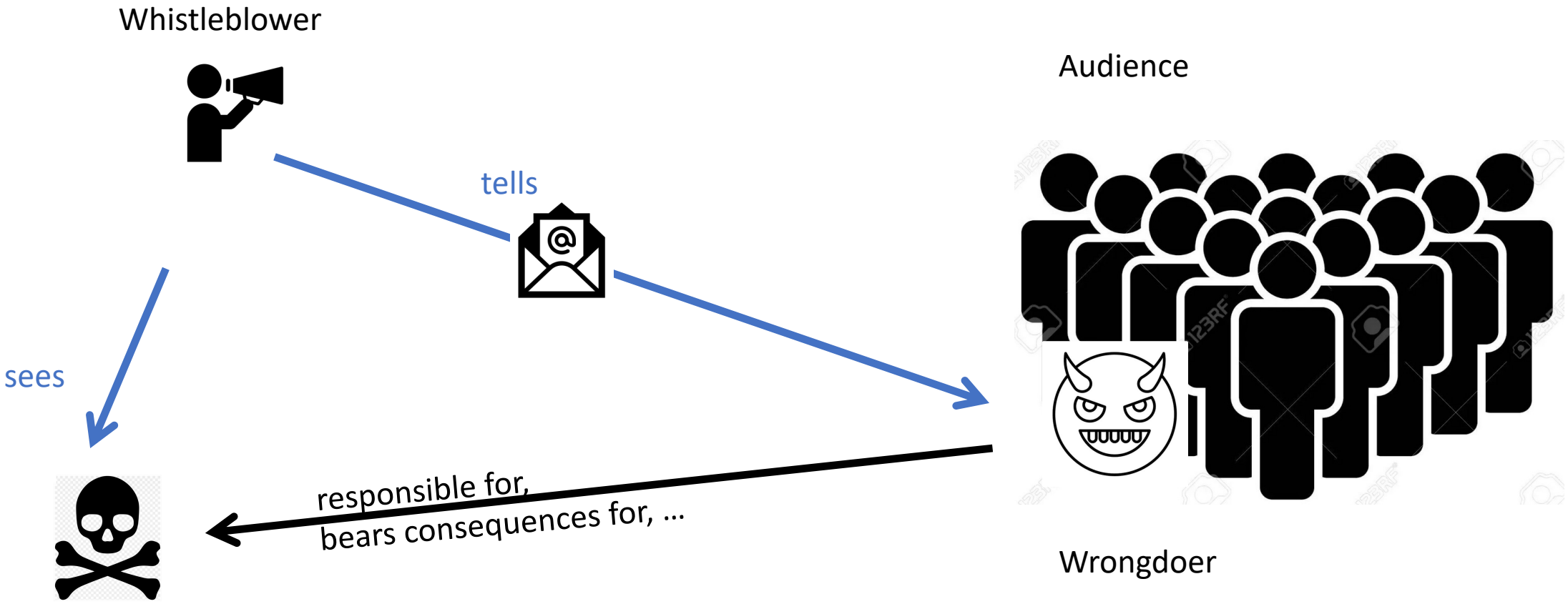
- The risk of retaliation is a major disincentive for potential whistleblowers (WBs).
- How to reduce this risk? Make retaliation

  - illegal (or at least protect WBs legally) — Law
  - otherwise shunned or even unattractive — Ethics codes, error culture, …
  - impossible — Possibility of anonymous reporting

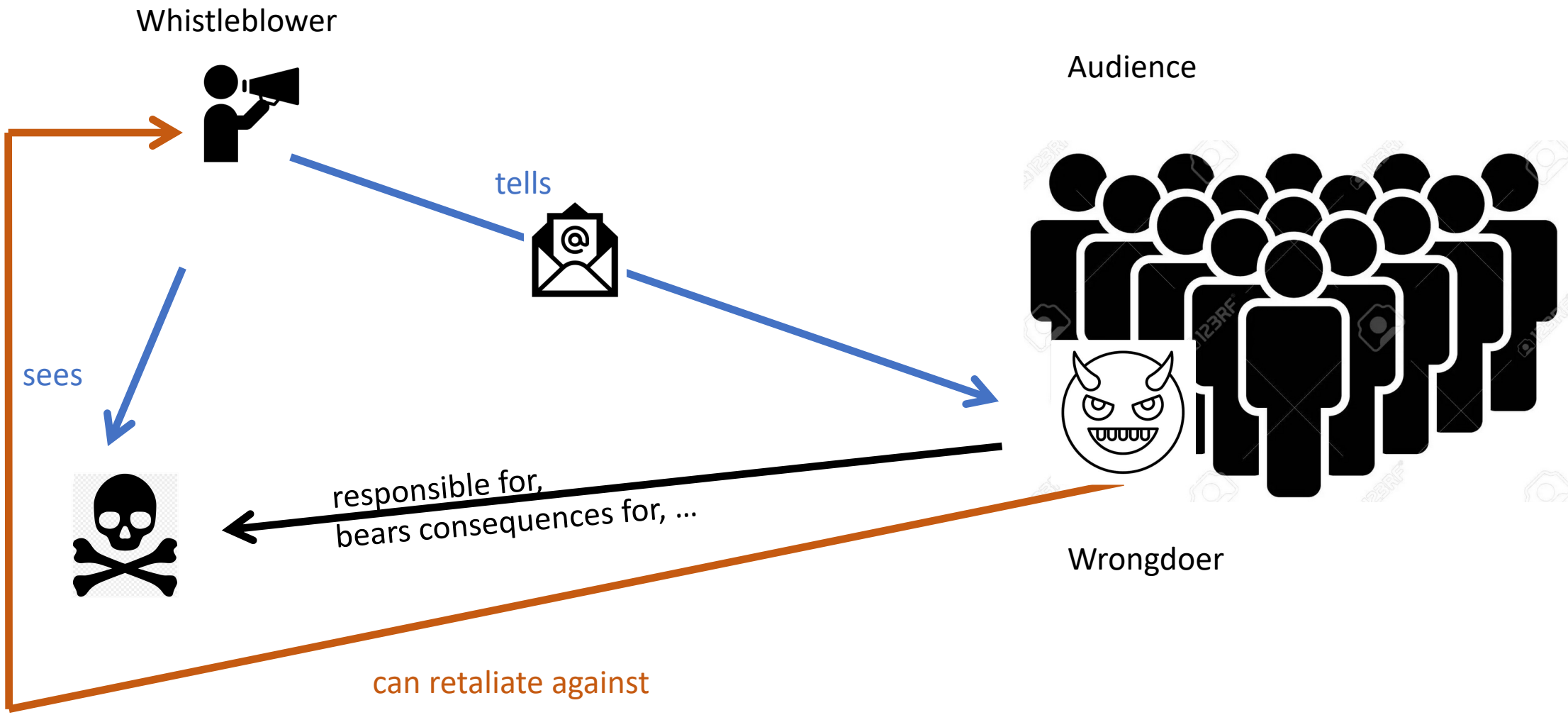
Whistleblowing as a communications problem (a *very* simplified view) (1)



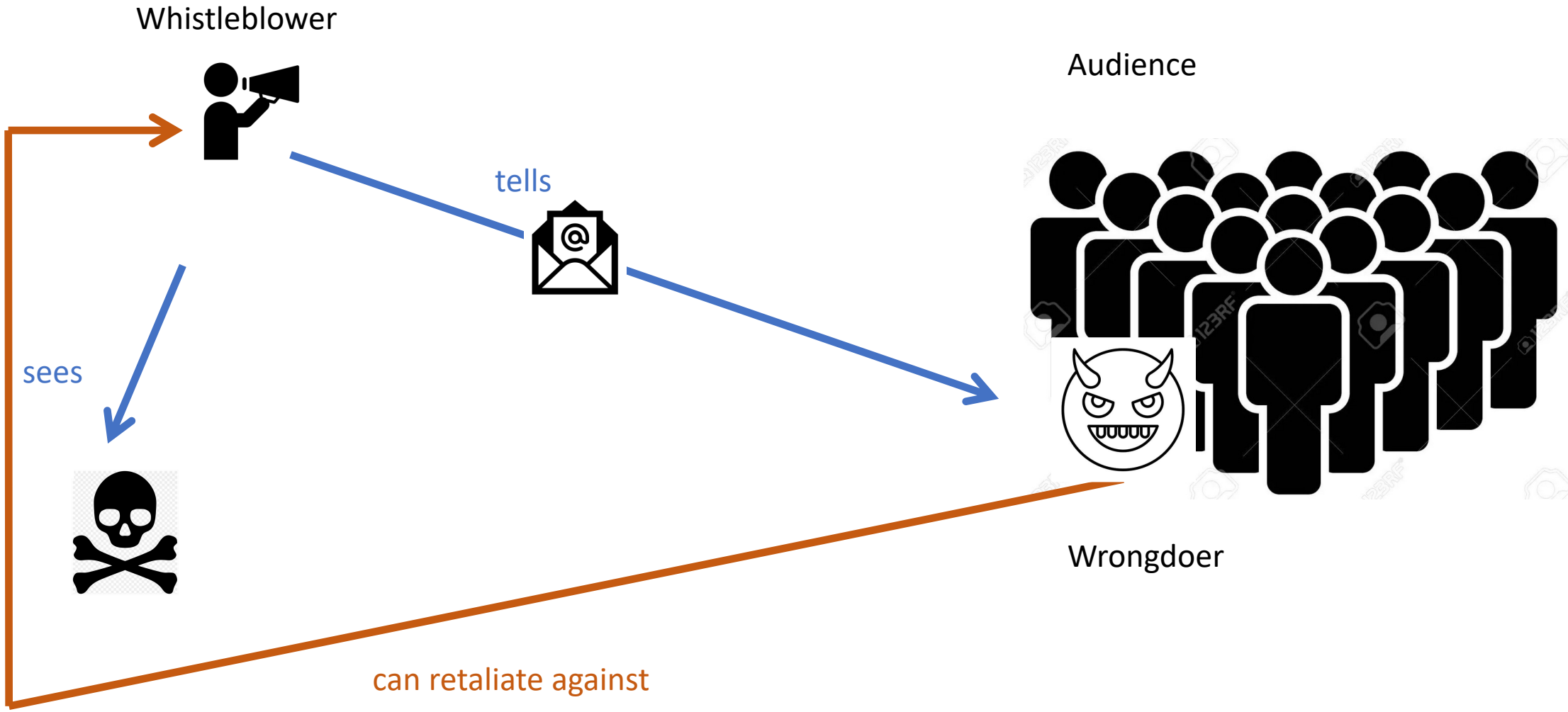
Whistleblowing as a communications problem (2)



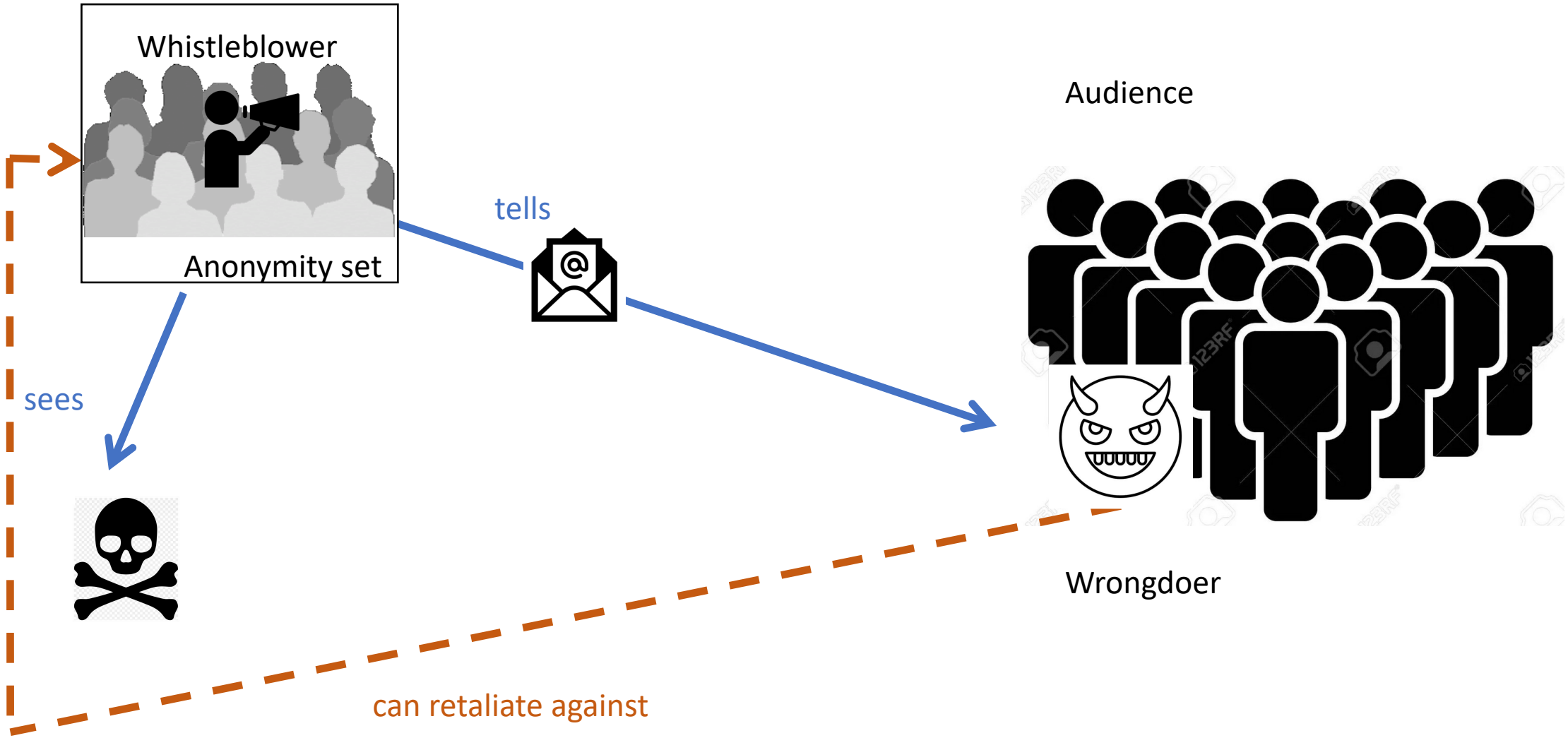
Whistleblowing as a communications problem (3)



Whistleblowing as a communications problem (4)



Whistleblowing with anonymity: the promise



Threats to anonymity

- Mistaking *confidentiality* for anonymity
  - a trusted entity knows the identity, pressure on this entity can reveals the identity
- *Direct re-identification*: based on cues
  - legal name, pseudonyms, fingerprints/DNA, unwise choices case management data
- *Addresses* of various types
  - physical location, email address, telephone number, IP address, GPS coordinates
- *Security measures*: Need-to-know, tracking, logging
- Inferences from report *metadata*
  - e.g. when a report was made, the voice of the reporter on a telephone hotline, the linguistic style and revealed lingo of a written report
- *Epistemic non-anonymisability*: Who are the knowers?
  - Small anonymity set. The message content may imply identity.

Anonymity is hiding in the masses

Idea: using general anonymity services such as Tor to hide.

SecureDrop (originally DeadDrop by Aaron Swartz and Kevin Poulsen, 2013)

- Implemented as hidden service in Tor
- Target Userbase: Journalists and their sources
- NT, Intercept, Süddeutsche, apache.be

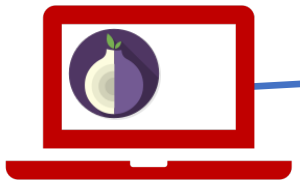
GlobaLeaks (2010)

- Implemented as Tor hidden Service
- Target Userbase: WB in Public service
- AWP: Ljost (Iceland), Filtrala (Spain), EcuadorTransparente , PeruLeaks

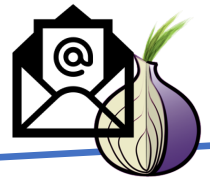
Daniel J. Sieradski - Flickr: Aaron Swartz

SecureDrop Architecture

Whistleblower:
Sees something;
tells something.

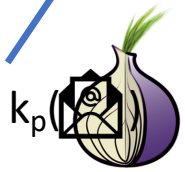


WB's Internet-connected PC with Tor browser



Encrypts Message using: k_p(@)

SecureDrop app. server



k_p(@)

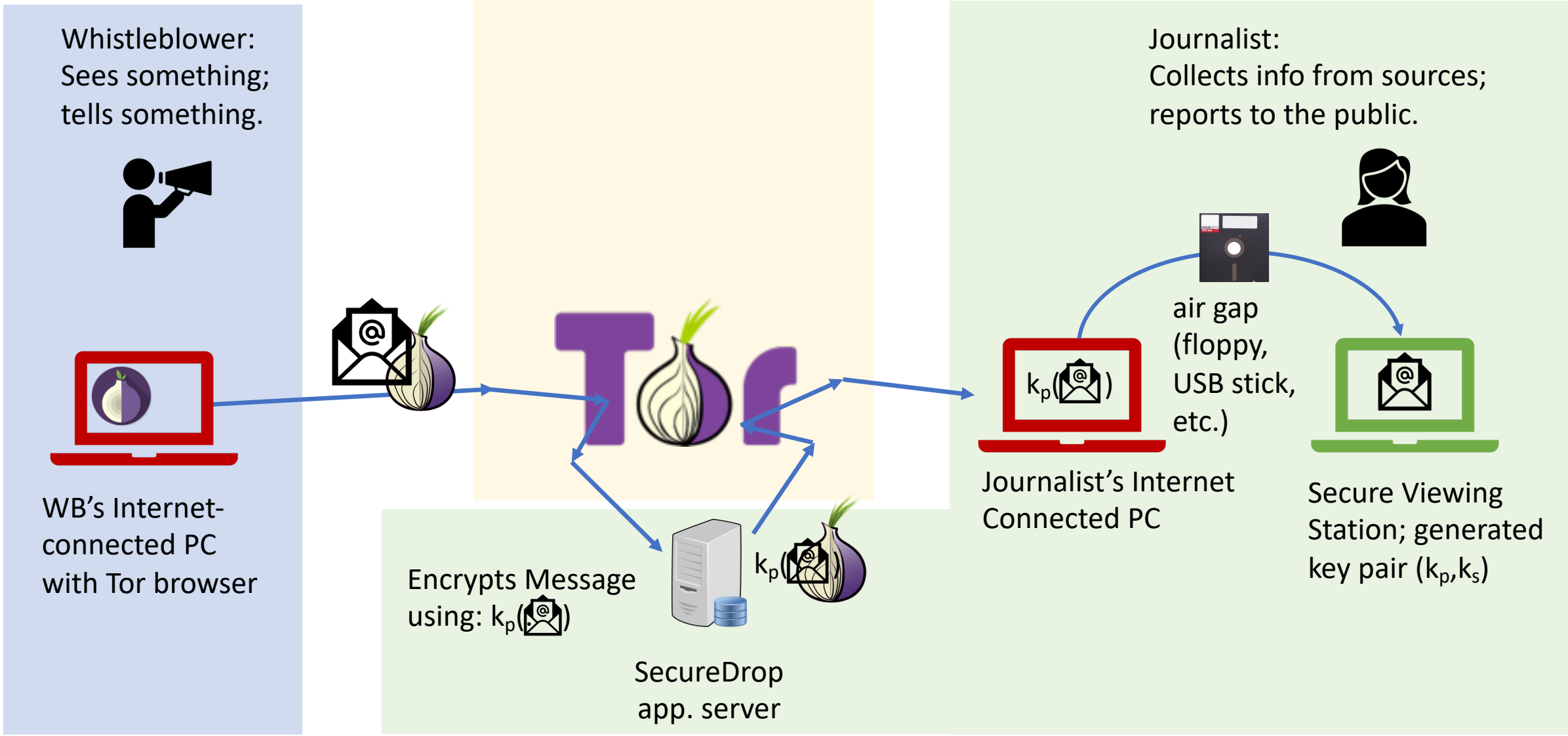
Journalist:
Collects info from sources;
reports to the public.

air gap (floppy, USB stick, etc.)

Journalist's Internet Connected PC

Secure Viewing Station; generated key pair (k_p,k_s)

SecureDrop Administrative Domains



SecureDrop's Protection Goals and Threat Model

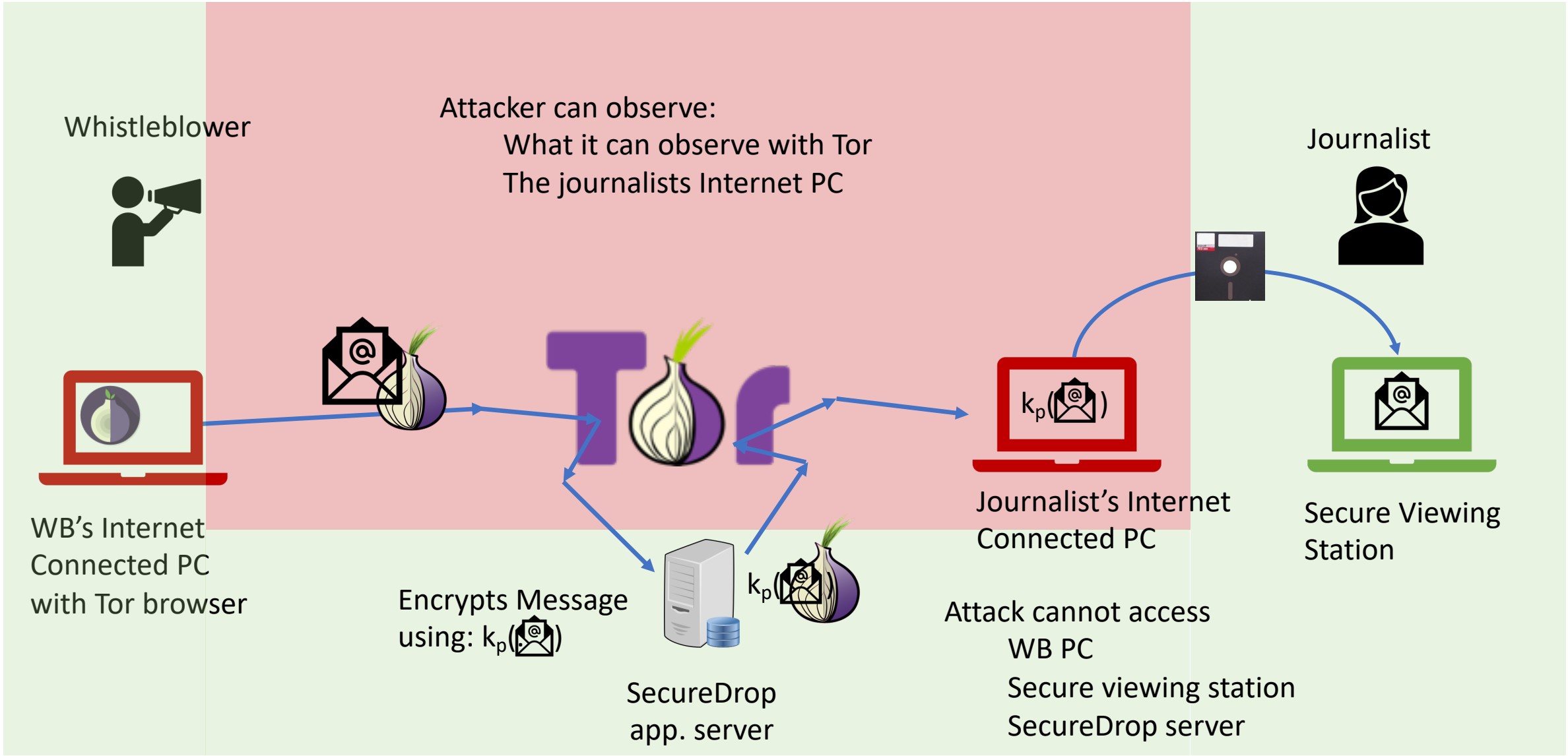
Protection Goals

- Sender Anonymity
  - Towards everyone (NSA, Network Provider, Receiver)
- Confidentiality
  - WB can establish a confidential channel to the Journalist

Threat Model

- Attacker can observe:
  - What it can observe with Tor
  - The journalists Internet PC
- Attack cannot access
  - WB PC
  - Secure viewing station
  - SecureDrop server

SecureDrop Attacker Model



Case Study: Could SecureDrop have saved Reality Winner?

- US Airforce trained cryptologic linguist -> left *Airforce* for inner conflict, realizing her translations helped to kill people
- Hired by Pluribus as translator and assigned a job at *US Army* post “Fort Gordon”
- She stumbled upon documents that implicated Russian hacking attacks targeting the 2016 US presidential elections
- Assessing that the government would not act upon this intelligence, she decided to leak these documents to *Intercept*

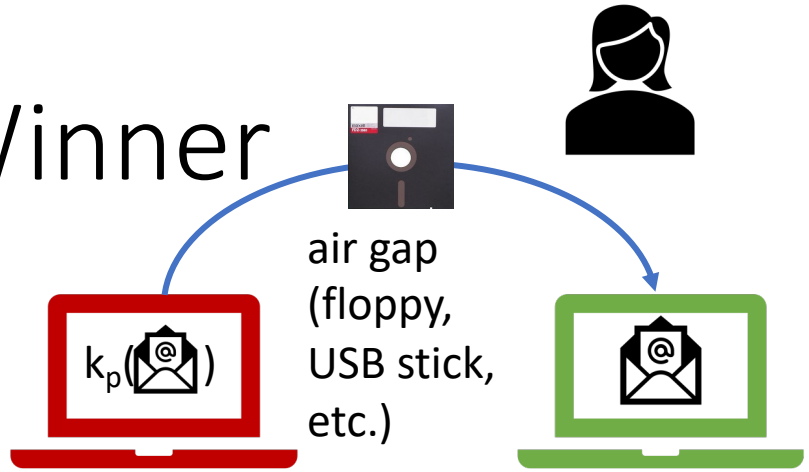
Case Study: Could SecureDrop have saved Reality Winner?

- *Intercept* shared these documents with the *NSA* for verification.
- *NSA* started investigation: 6 suspects had access to said documents;
- only Winner contacted *Intercept* from her work computer
- Further documents appeared to be scanned from hard copy. Scans contained ID dots of the printer.

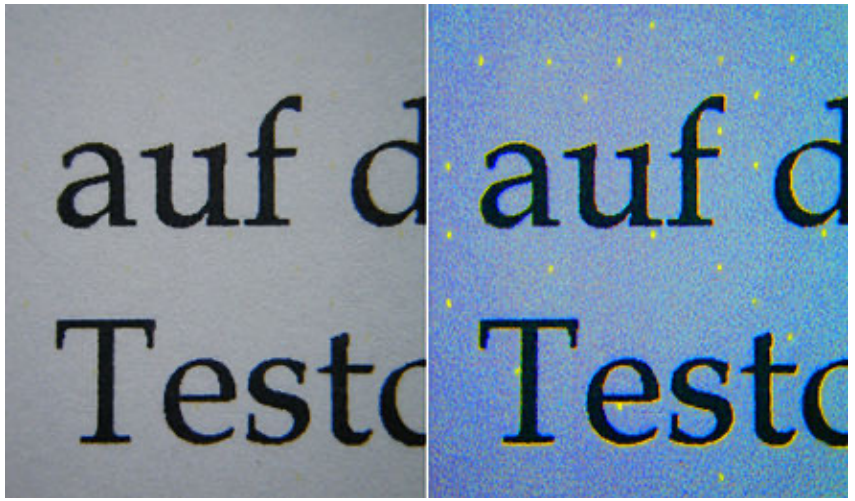
Case Study: Could SecureDrop have saved Reality Winner?

- Winner was charged with “removing classified information from a government facility” → 63-months sentence.
- She was released under probation in mid 2021.

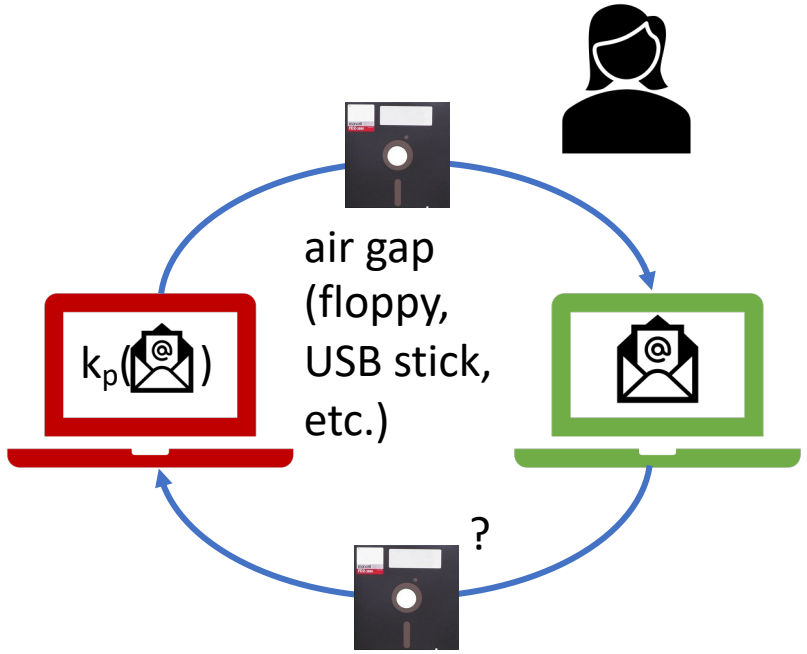
Potential SecureDrop gain for Winner



- SecureDrop would have hidden that Winner contacted Intercept
  - However: initial anonymity set of 6 is small (other potential clues like timing very likely).
- Main evidence: Printer's Machine Identification Code



Is the air gap in SecureDrop real?



- Depends on the actual machine for the SVS
  - Can it write on any other device?
  - Does it store any plaintext?
  - How is plaintext otherwise treated?
  - Who provides this machine?
- Case Winner: Journalist sent original evidence to NSA

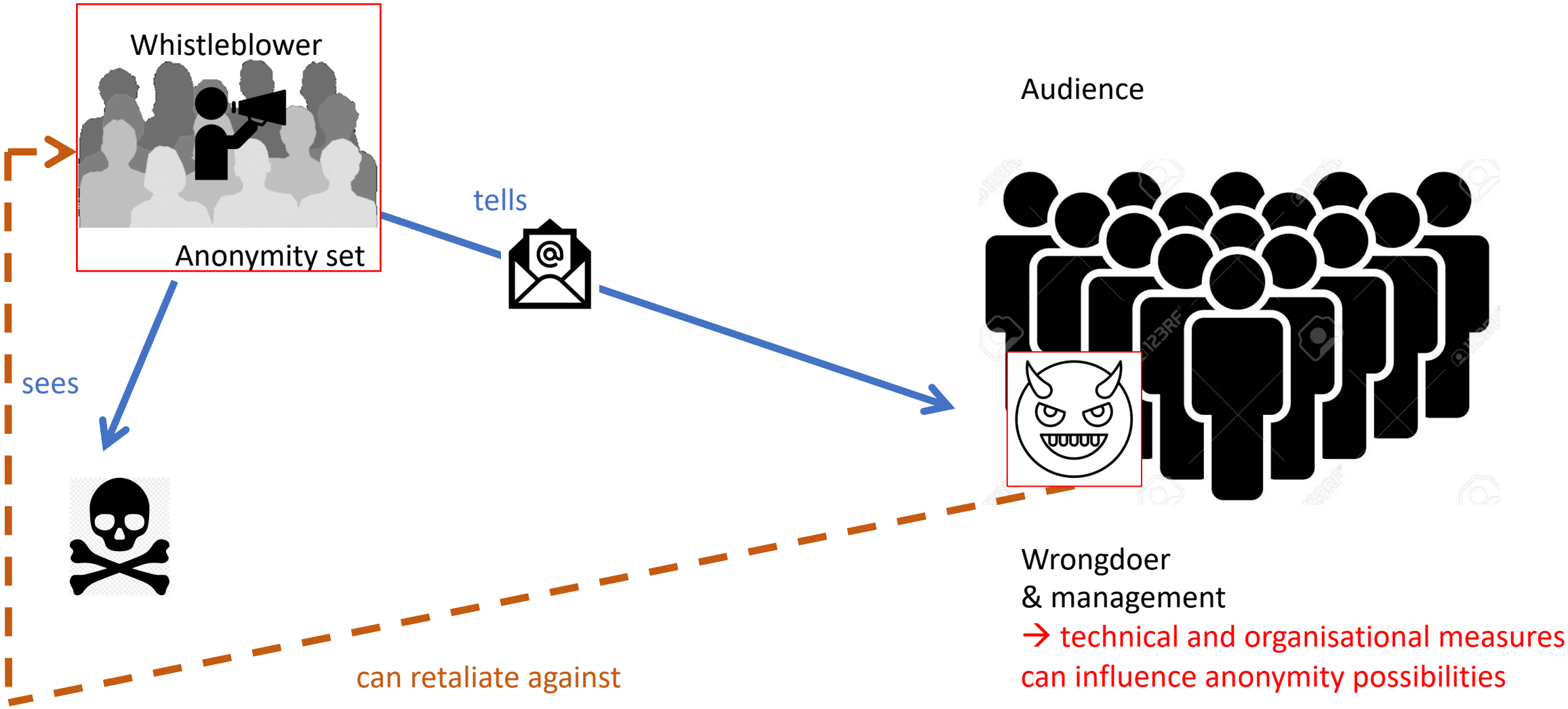
Journalist‘s burden even if technology is magically provided

- Winner’s anonymity set was reduced by the fine-grained evidence delivered by Intercept to the NSA.
- Journalist would need to know what NSA knows to assess what can be shared.
- There might be no utility left…

So far for journalists; what is different for our application

- Trust assumptions:
  - No “neutral” instance that can set up and run the system

Outlook: The anonymity set depends (also) on the wrongdoer – risk and opportunities



Discussion:
Choices influencing anonymity possibilities?

- Fictitious ex. of management choices that trade off a security loss against a whistleblower-incentivisation gain: “k-anonymous access control” + ”k-anonymous logging”
- How could/would this be argued?
- In different domains?
  - “top-secret documents” (Winner) vs.
  - “accounting data” (Wirecard)