Incident response in the energy sector

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FIRST, Forum of Incident Response and Security Teams

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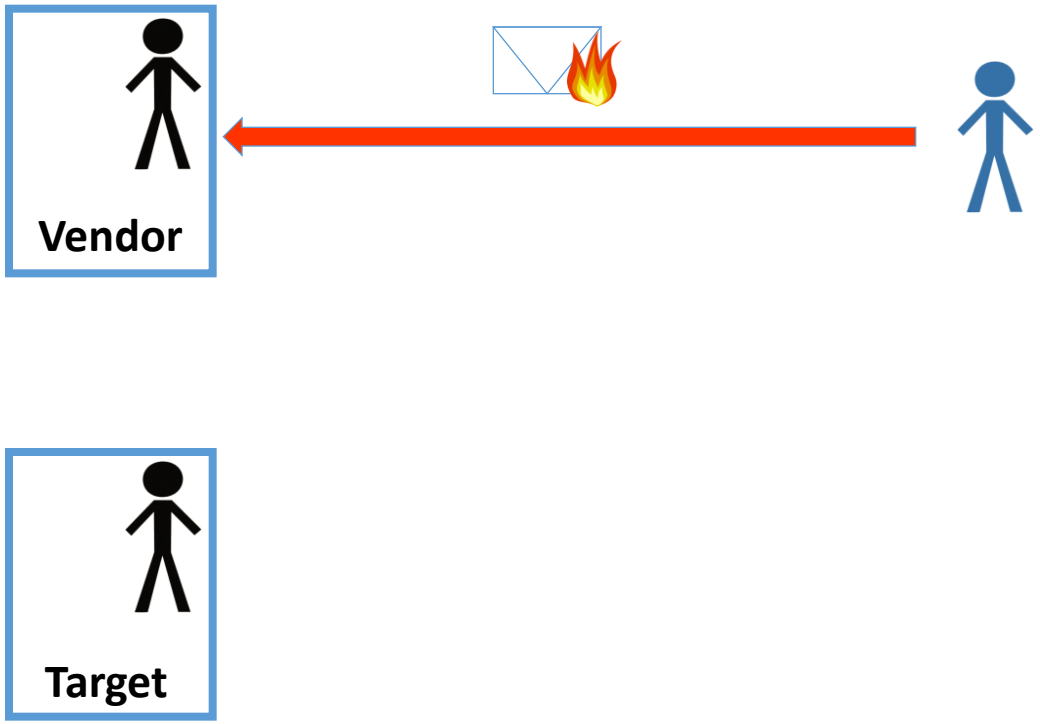
Statnett

Incident response

- IR is more than just a characterization of an incident, it includes analysis
- Many companies are reluctant to share incident data because of reputation or fear of repercussions from the regulatory authority
- Unfortunately this is a policy that hinders good incident response

Combination attacks



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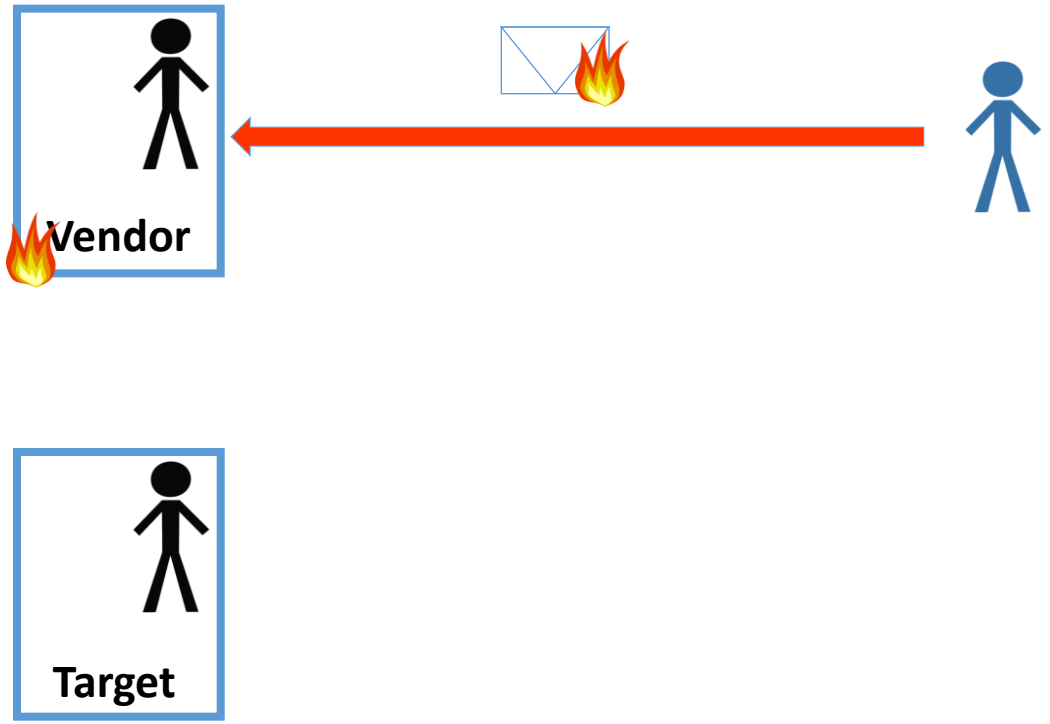

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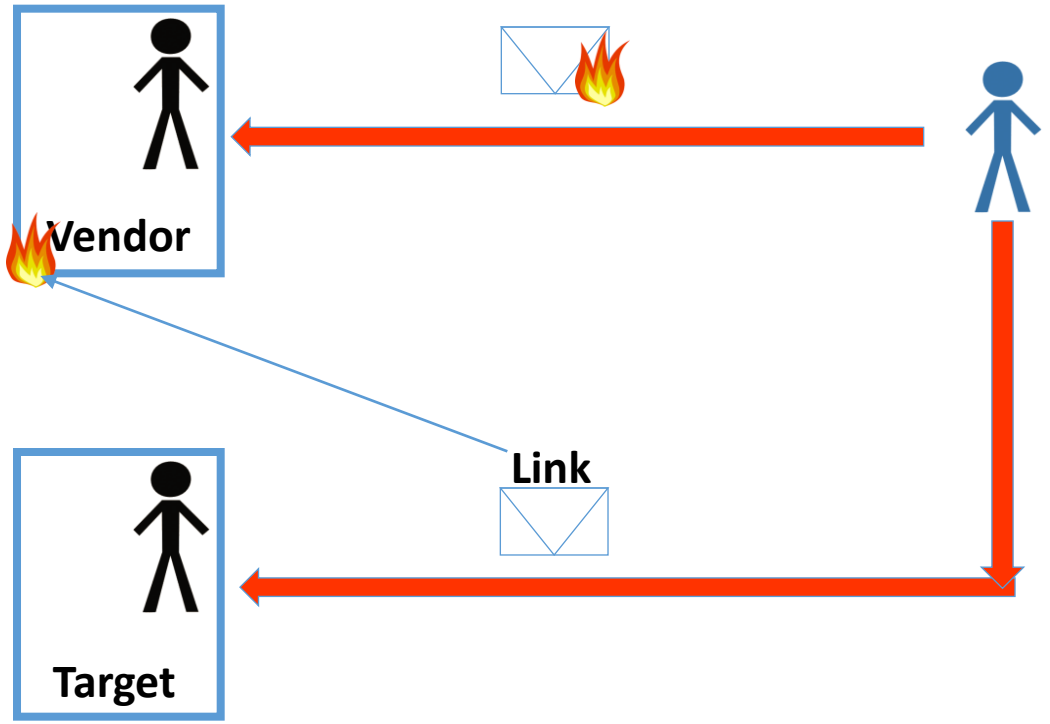

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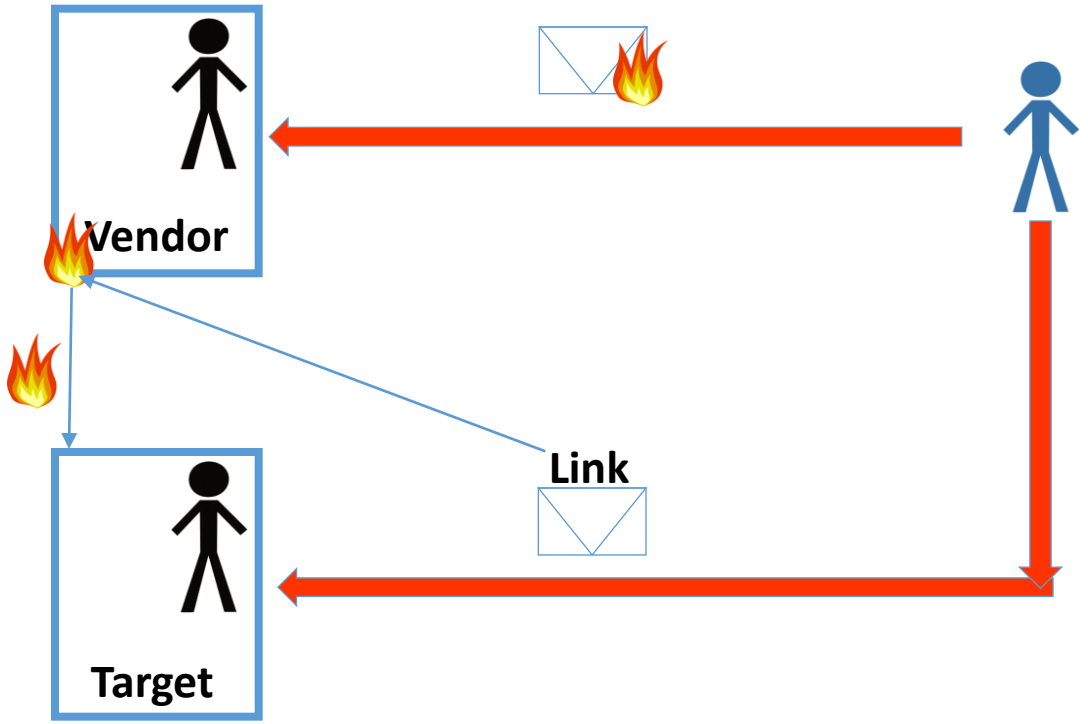

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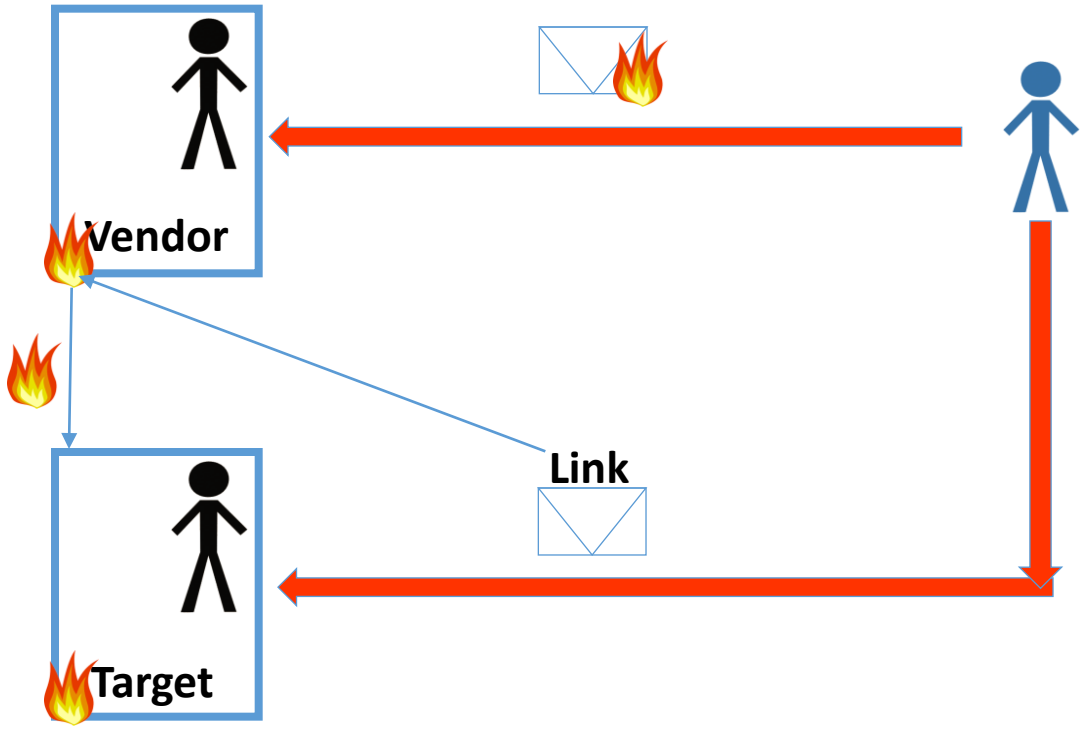

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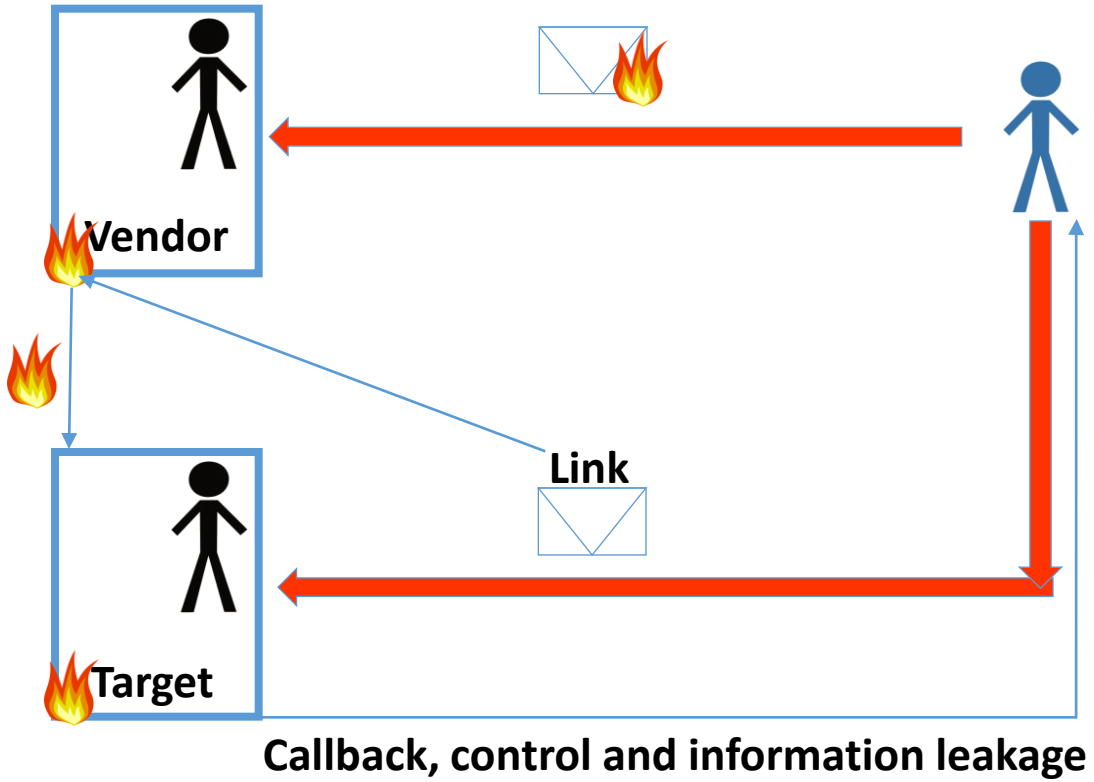
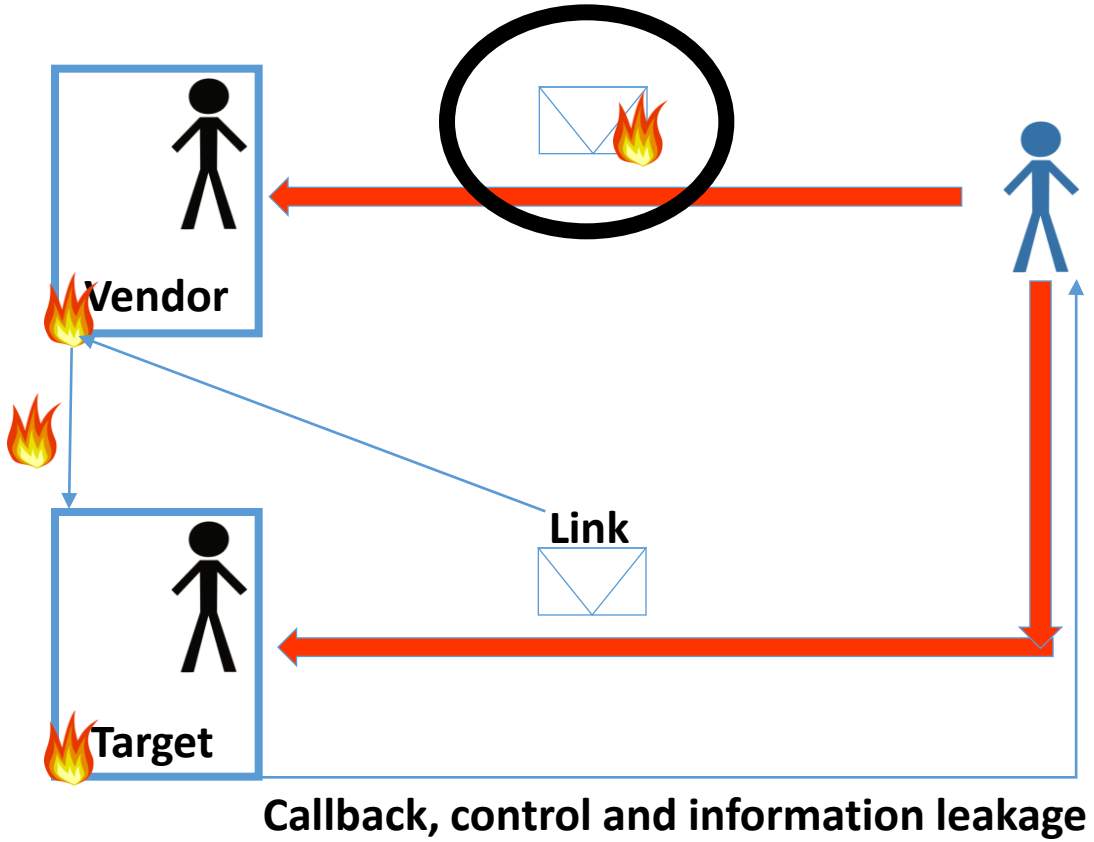


Detecting, assessing and reconstructing



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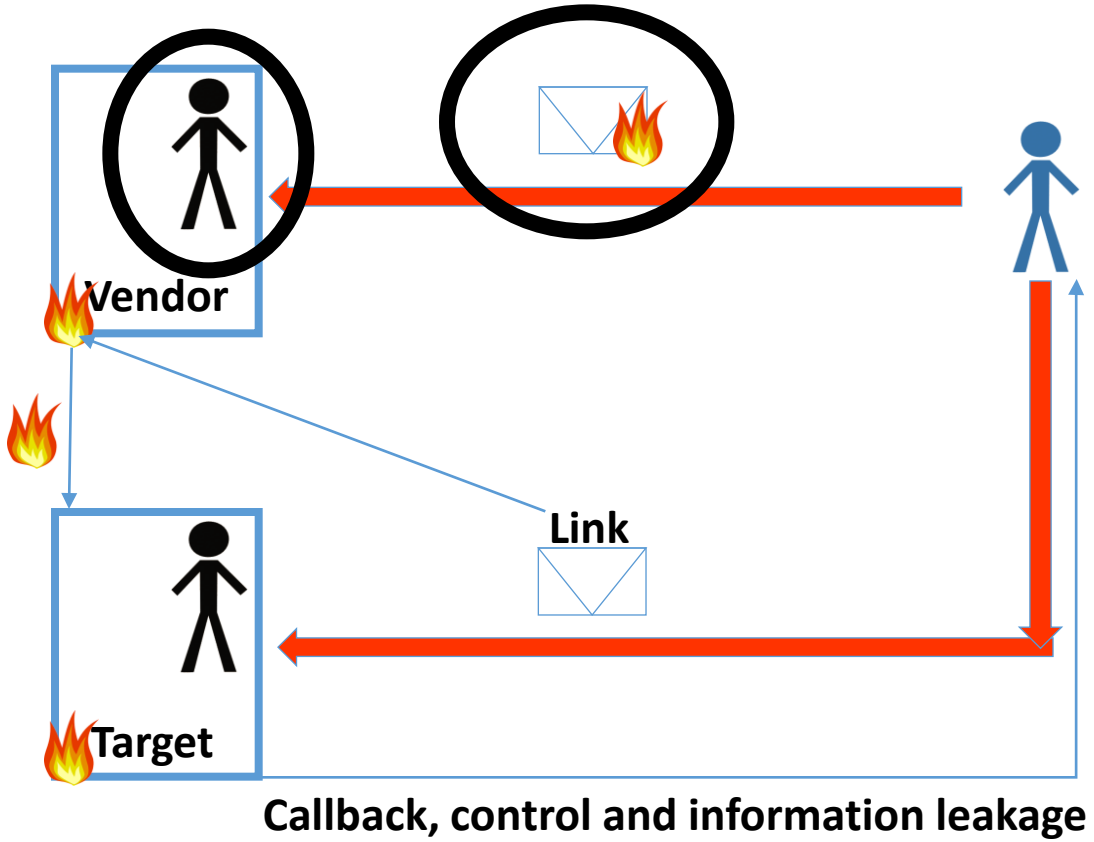

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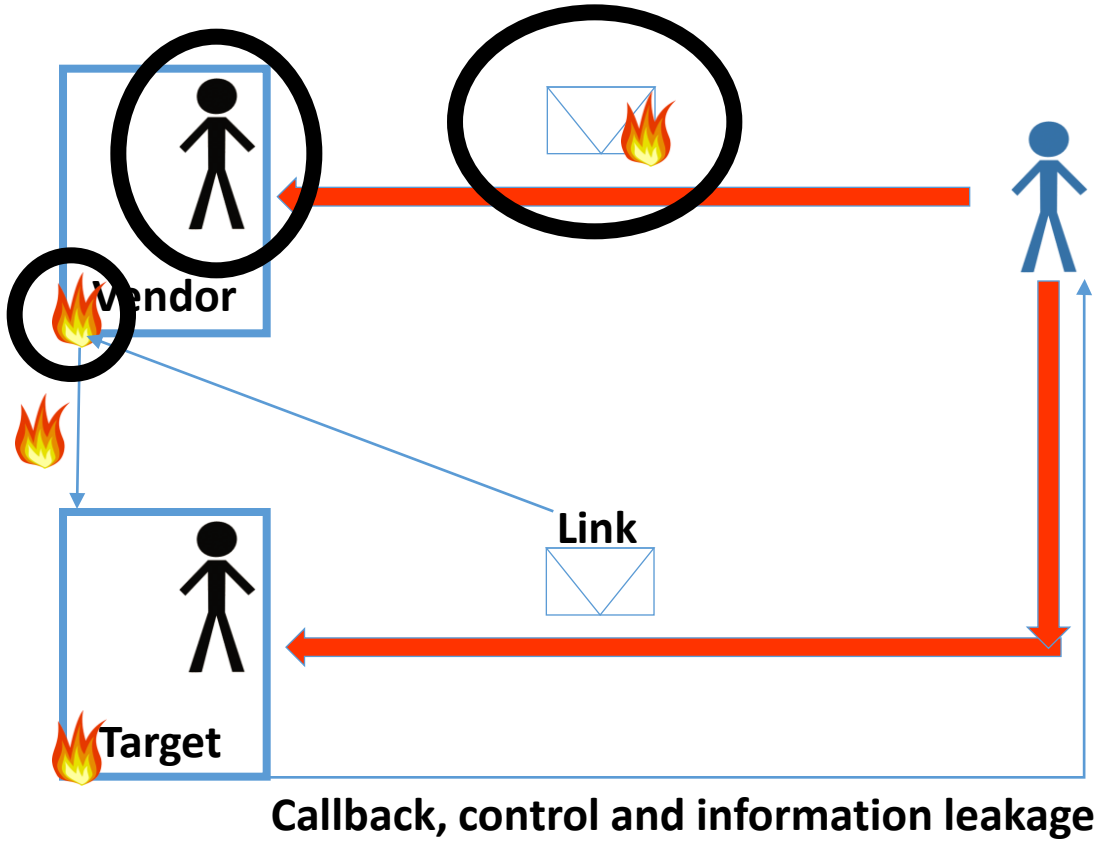

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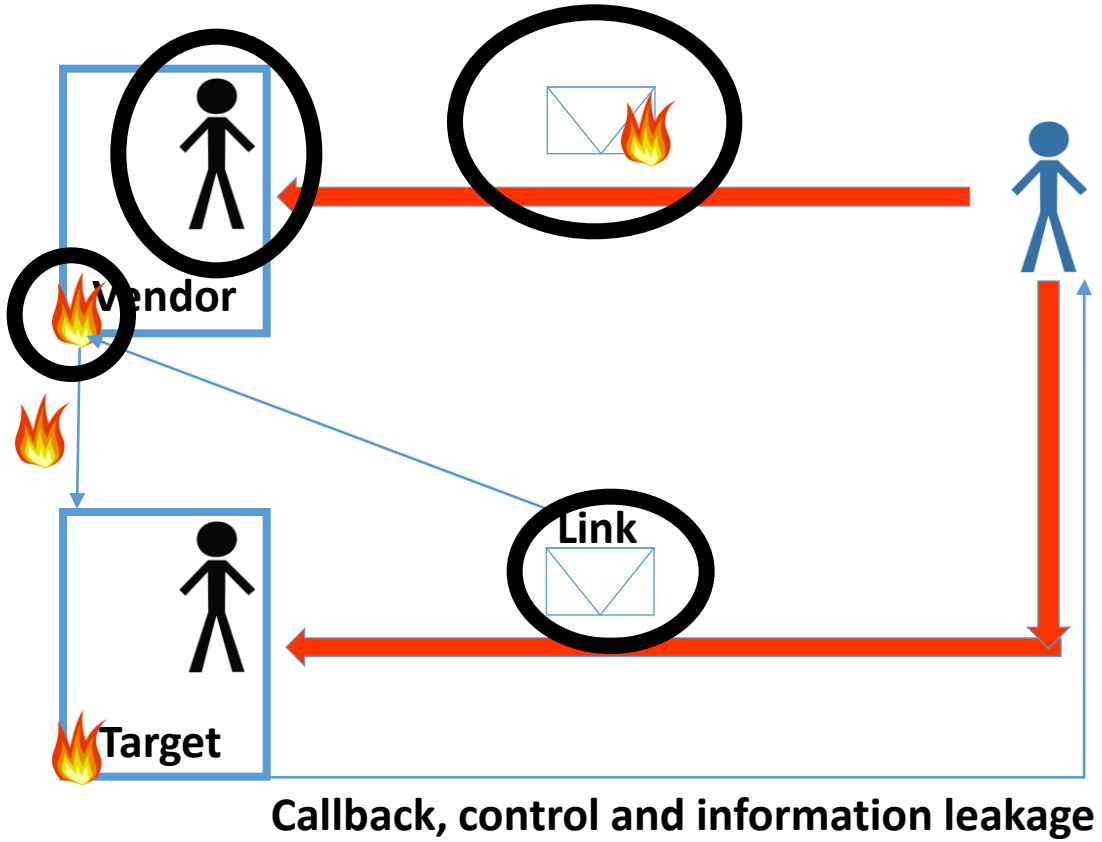

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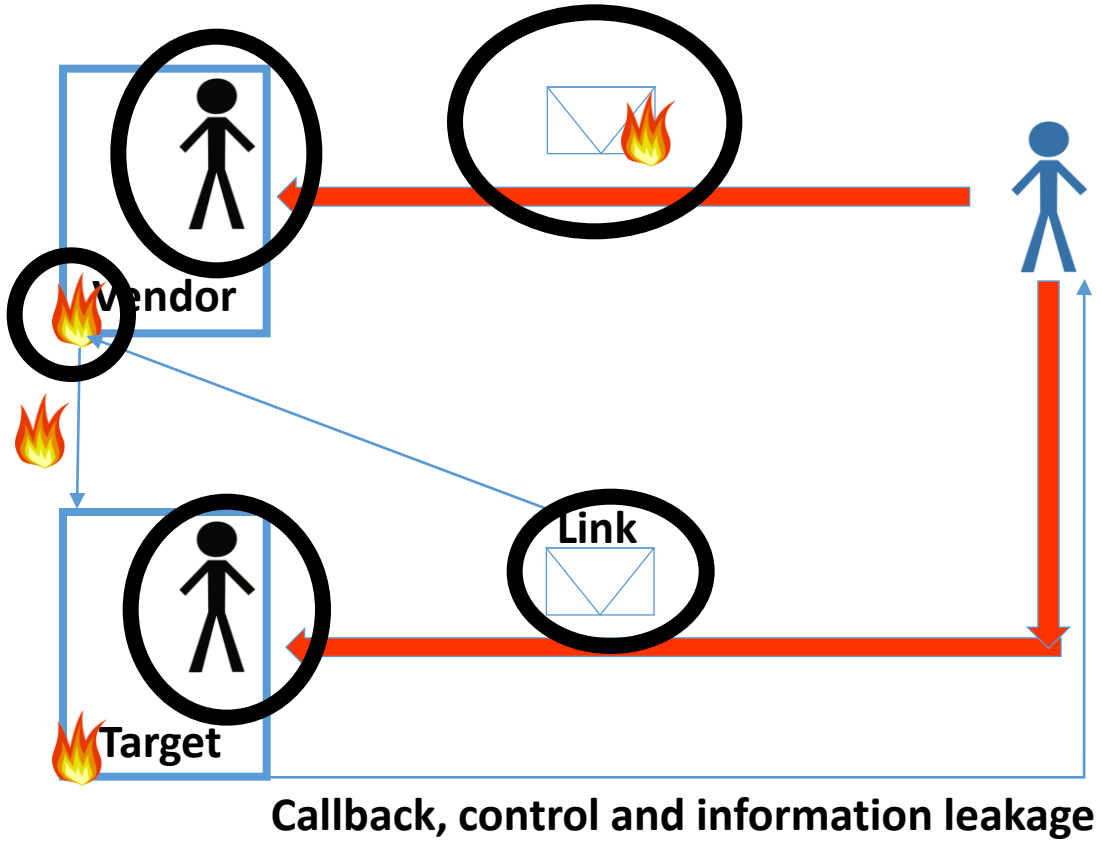

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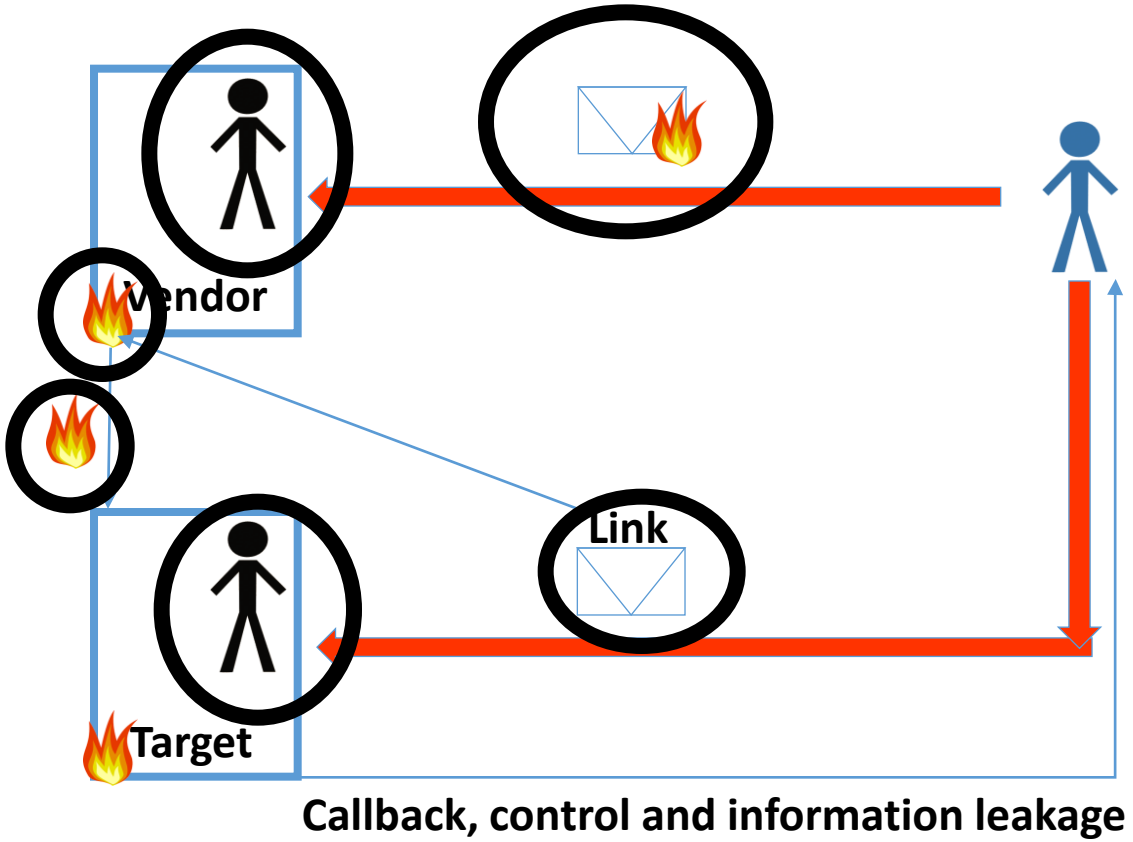

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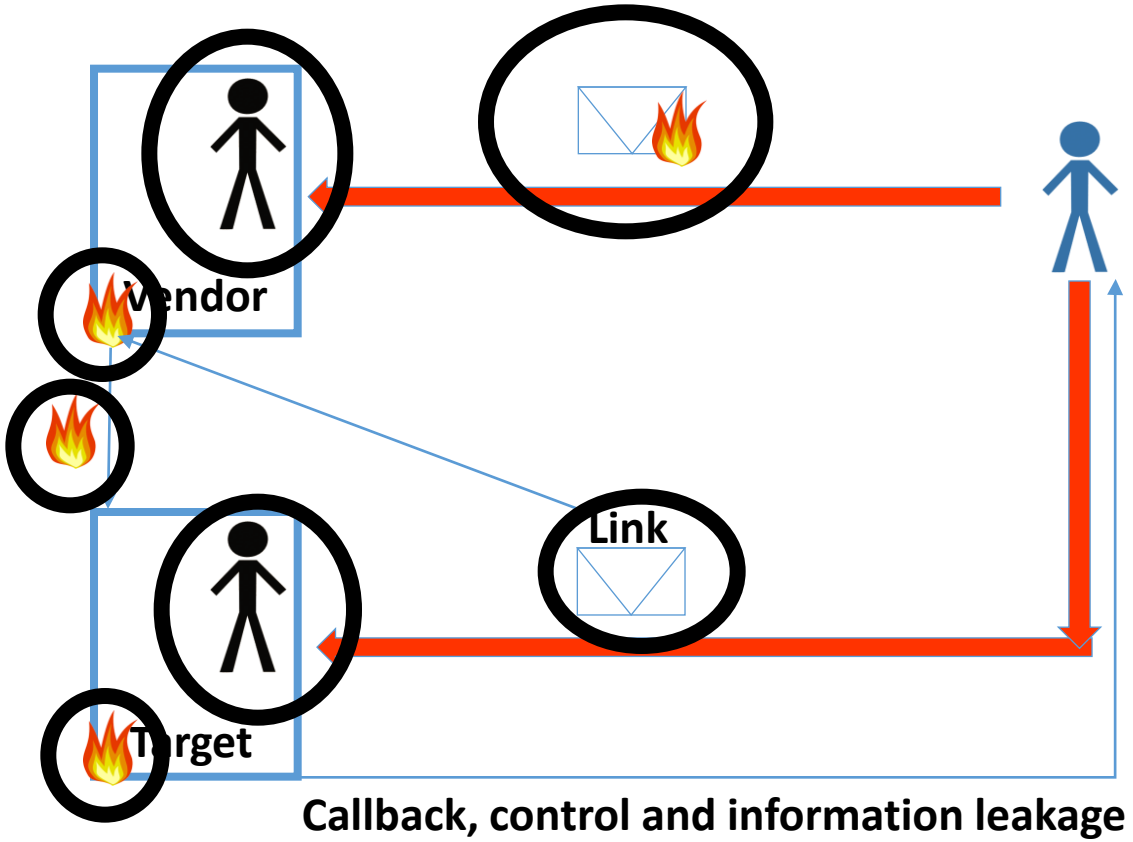

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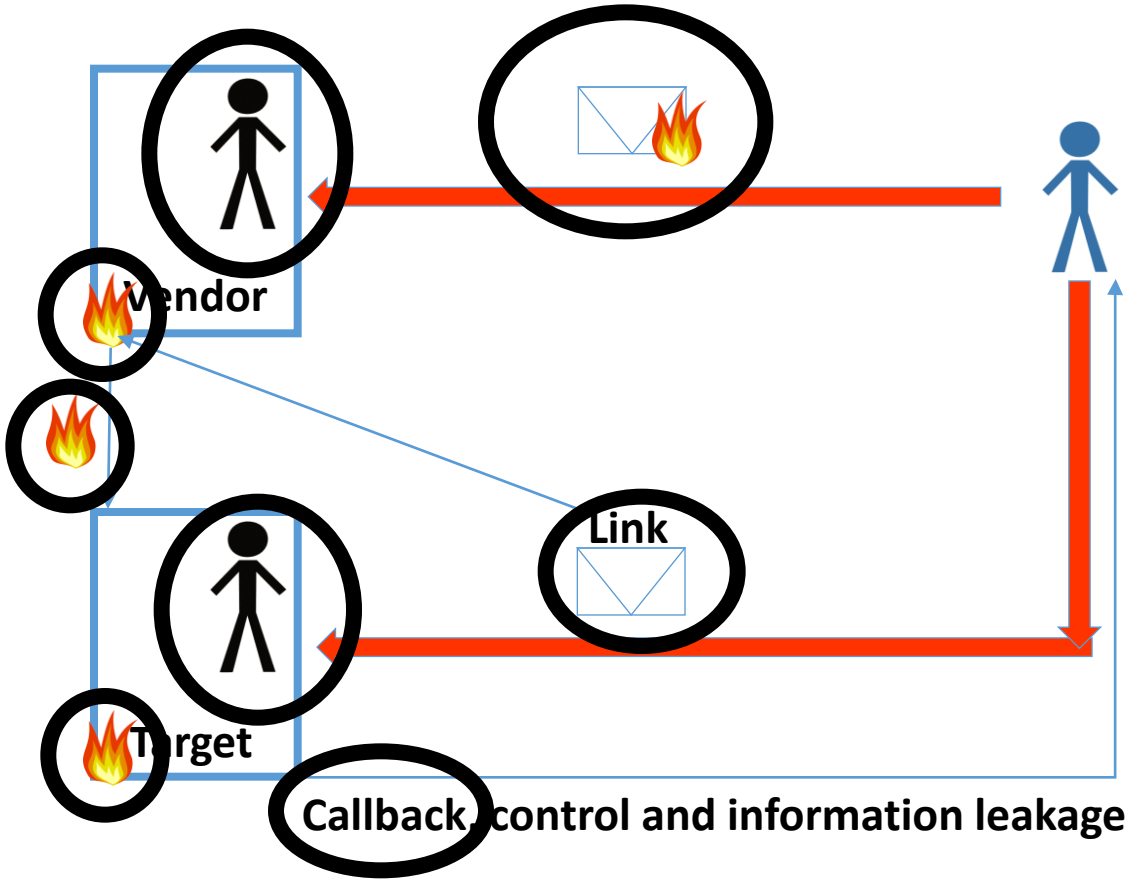

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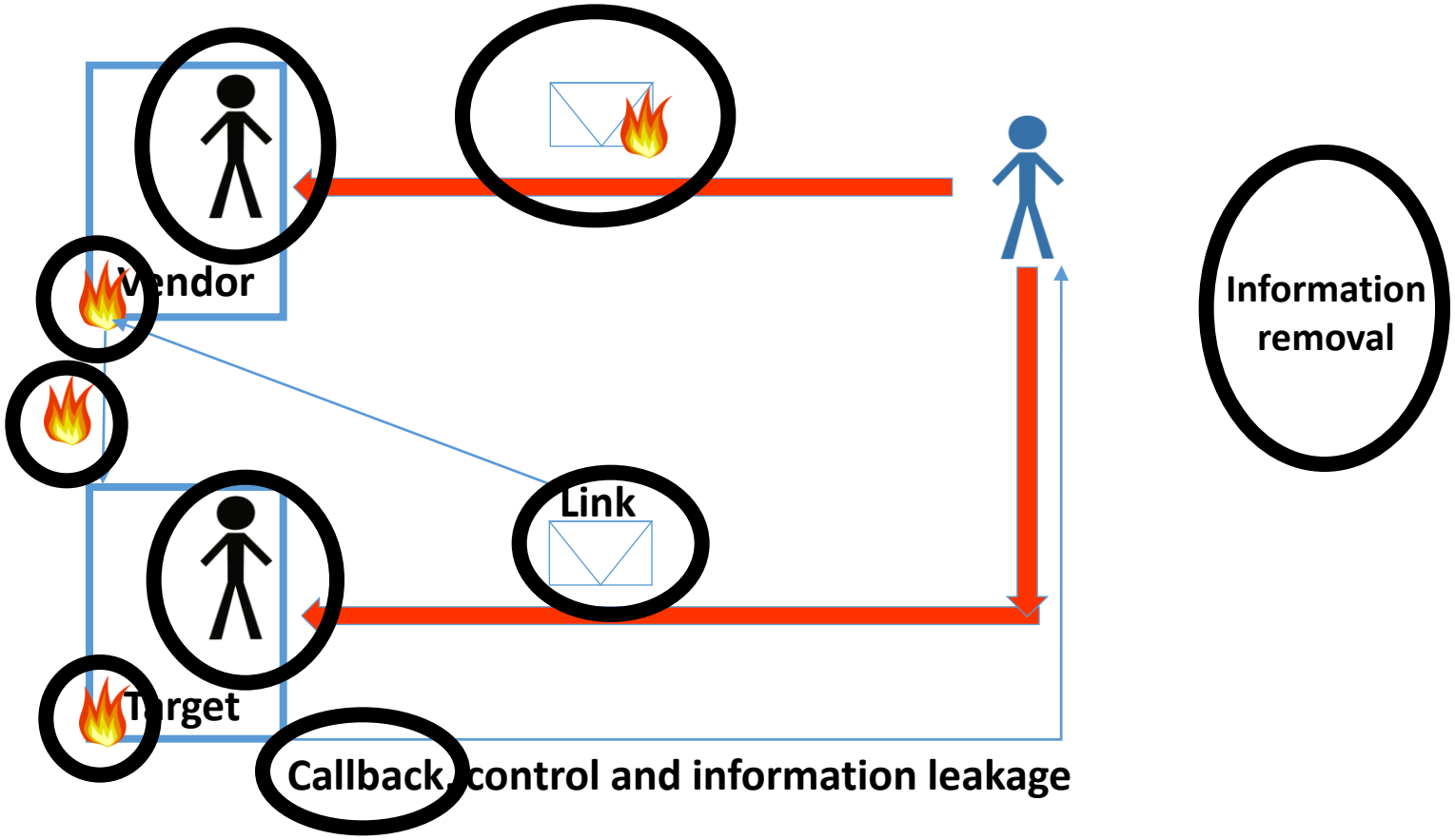
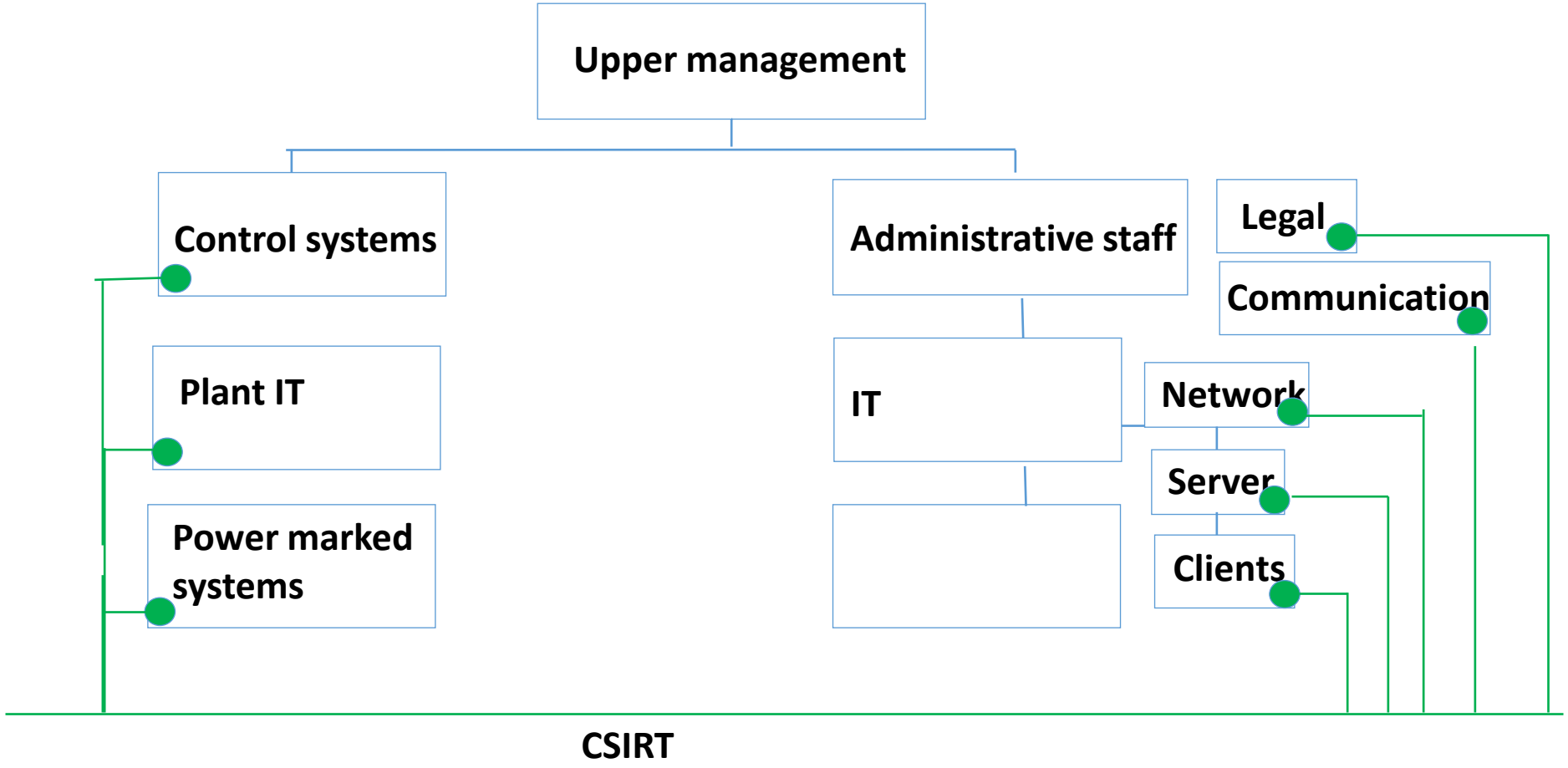


Why a specialized incident response team?

- Incident handling is done faster and in a uniform manner
- Avoid costly mistakes
- The team knows what to do and whom to inform
- They regain control
- They reassure the organization AND the customers
- They can be an internal bridge between departments

Virtual team



CSIRT vs the emergency response team

- This team gathers at a certain severity level.
- The CSIRT starts earlier and work continuously together
- ERT deal with physical disasters and accidents
- Most CSIRTs deal only with information security incidents with an adversary (even if it is information leakage)
- The CSIRT must know when to call upon the ERT
- The ERT uses the IRT to assess damage, decide how to contain the incident, how to gather evidence etc.

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The levels of severity need to be harmonized

- What the CSIRT calls a code red is not the same as for the ERT
- If the impact in production systems are unclear, all of the organization should be on alert, for example if a computer or a user that has access to the production network is hit by malware
- Again: the CSIRT should span all of the organization

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Working together

- The communication and setting the criticality should be exercised
- They should be aware of the other group's classification scheme
- The collaboration will evolve, and be dynamic
- They can be one team to rule it all, but you probably don't need the whole ERT in every meeting

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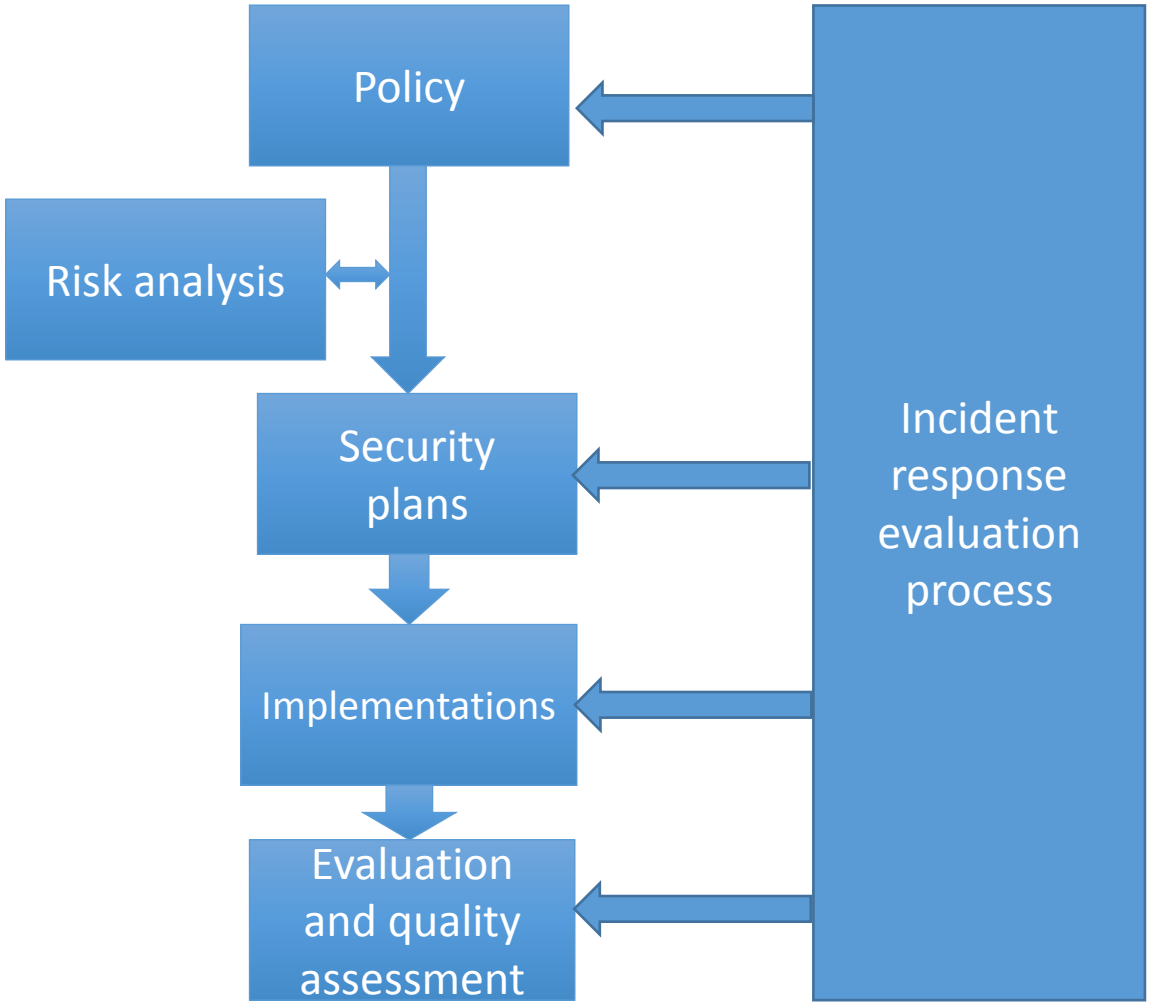
Continuous improvement

- The feedback loop is crucial
- A CSIRT can improve the processes of
  - Policy making
  - Risk analysis
  - Security planning
  - Emergency planning
  - Evaluations & audits

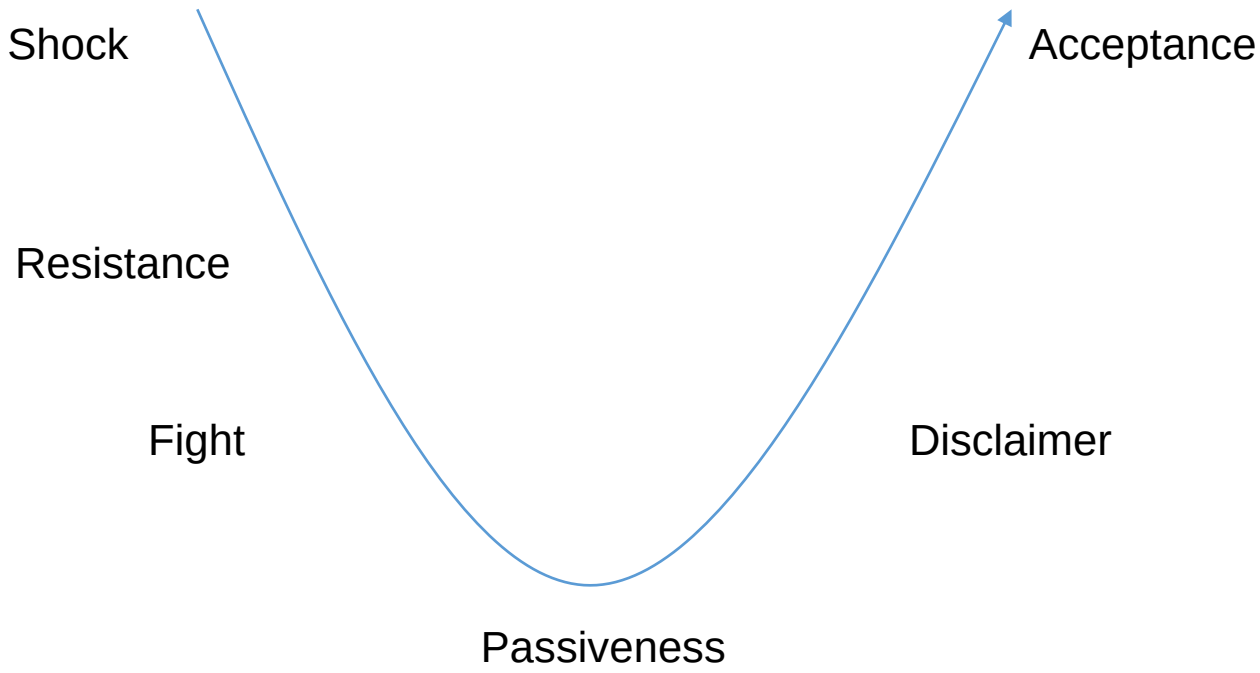


Reorganizing large organizations is like reorganizing a cemetery.

Organizational obstacles

- We have managed for years without!
- We *have* people doing security
- We have enough competence to cover this
- This will become a state within the state
- Will this just not cost us more money?

The stages of change



Organizational issues

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- Clear constituency

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- Mandate to manage and make changes

Organizational issues

- Clear constituency
- Mandate to manage and make changes
- Give the team time to develop culture

Who is your team?

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- The ones that log

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- The ones that operate equipment that may be compromised

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- Communication

Who is your team?

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- Communication
- Legal department

Who is your team?

- The ones that log
- The ones that operate equipment that may be compromised
- Communication
- Legal department
- People who are interested

They should be team players with

- Common sense
- Communication-and diplomatic skills
- Patience and persistence
- Creativity
- Serenity
- Discretion
- Concentration
- Tidy
- With technical skills and a good legal instinct

Incident detection

- Always difficult to identify an incident among false positives or from human error
- Even worse in control system: vague indicators, small changes, incomplete symptoms
- Baseline the system activity, the events and the traffic is useful, and of course log correlation with alarms.

The importance of tidiness

- Focus on ***what*** has happened
- Think of how you obtain evidence keeping the chain of custody
- Think of how you store evidence (sanitize and write lock)
- Digital signing and checksum
- Involve the legal department

Do I have SSL v.1.0.1? I don't knooooooooow…

Knowing your network

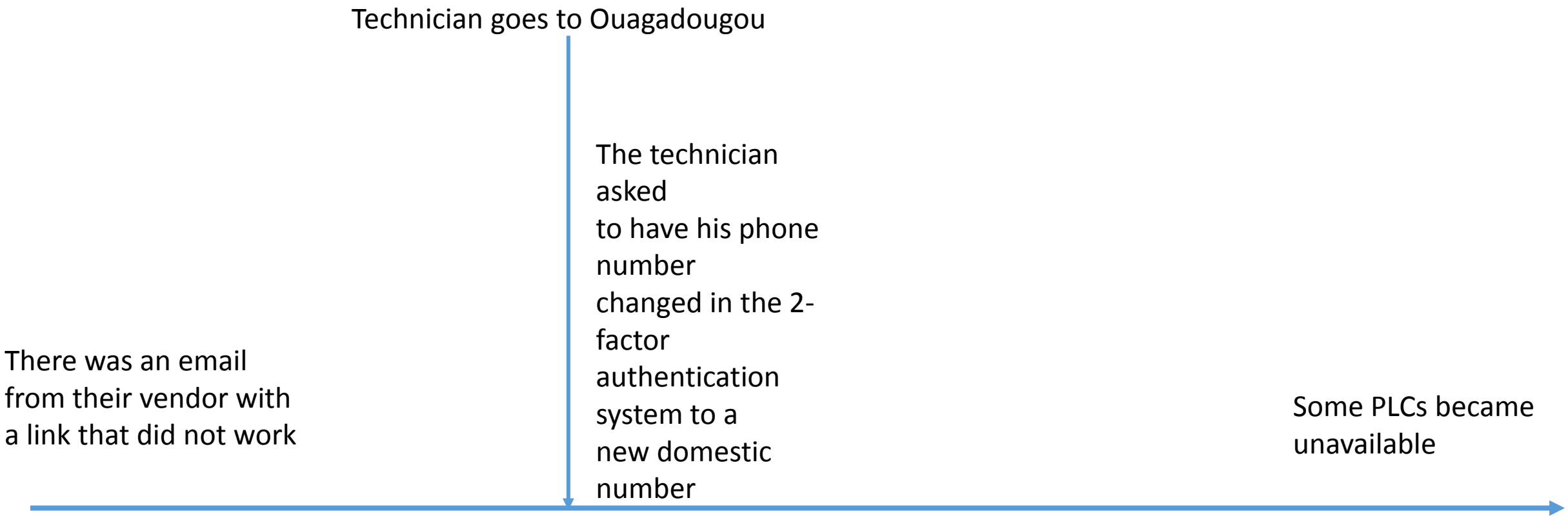
- It's too late to take inventory
- How does the information flow?
- What kind of information flows where?
- Knowing your protocols
- Knowing the best way to contain an incident (especially SCADA)
- Knowing the criticality of the resources

Knowing your logs

- Servers and user devices (including tablets and phones)
- ICS devices
- Network traffic (when the device does not log)
- Security appliances, VPN servers
- Directory services
- Name servers and DHCP-servers
- Web servers, proxy logs and application logs
- Databases
- Email and chat applications
- IP telephony logs
- Key cards, surveillance camera
- **Clocks and time format**

Establishing a timeline

- Some PLCs became unavailable
- Technician is in Ouagadougou
- There was an email from their vendor with a link that did not work
- The technician asked to have his phone number changed in the 2-factor authentication system to a new domestic number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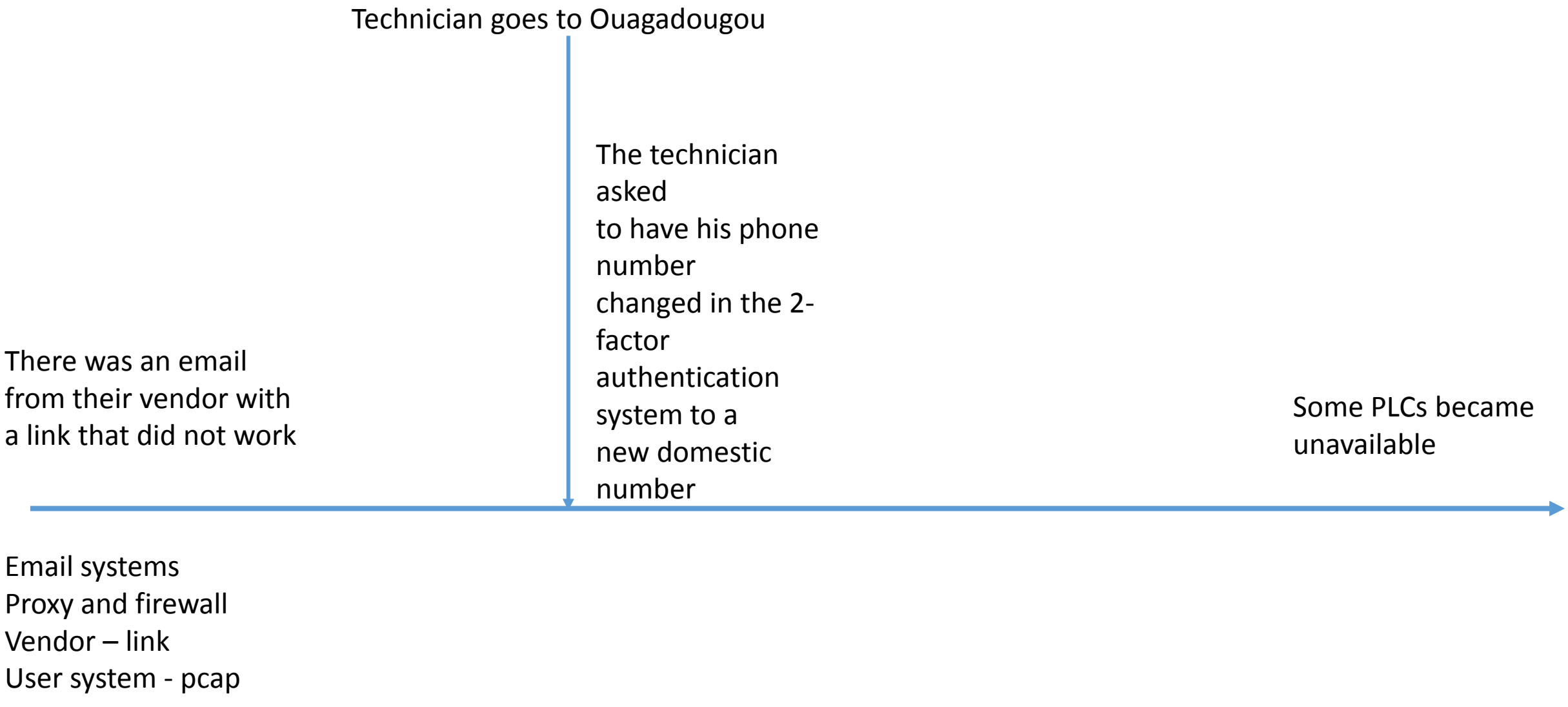
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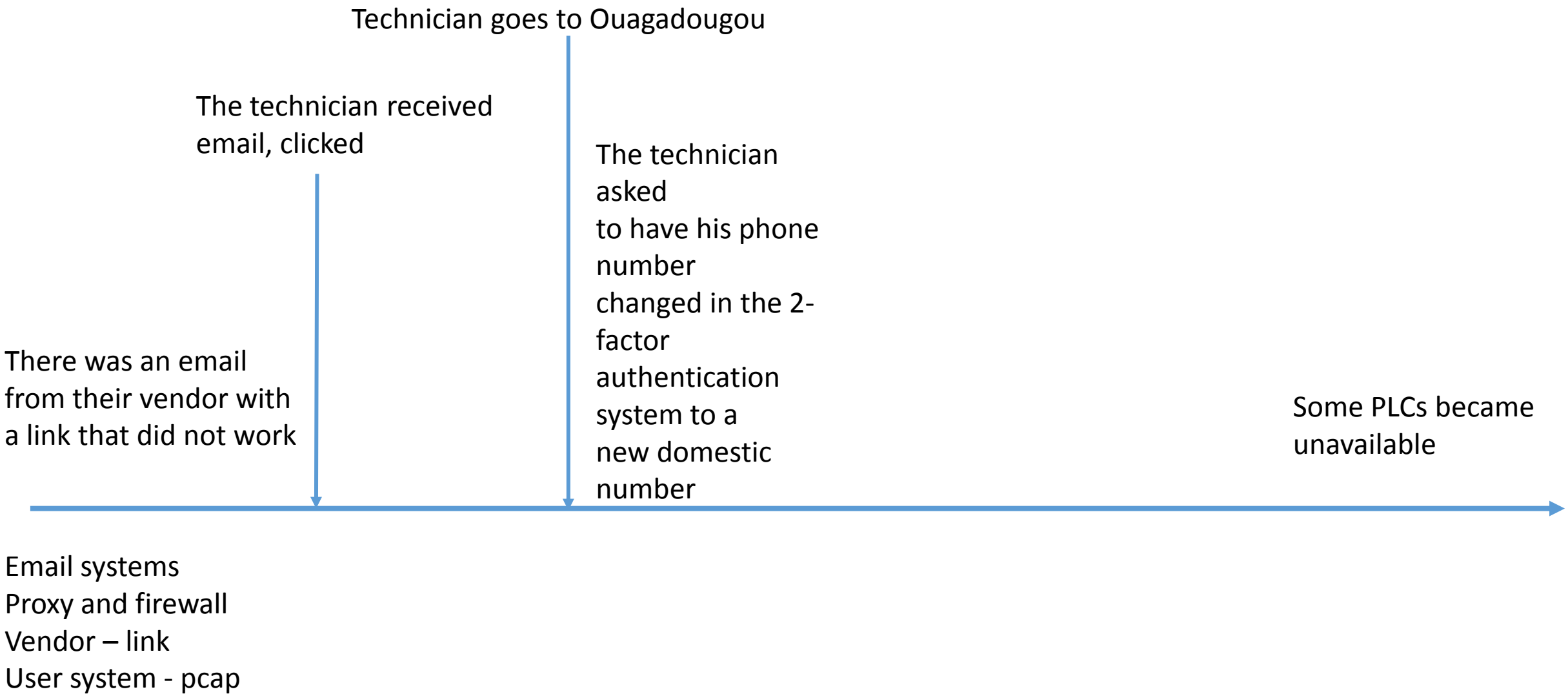
Proxy and firewall
Vendor – link
User system - pcap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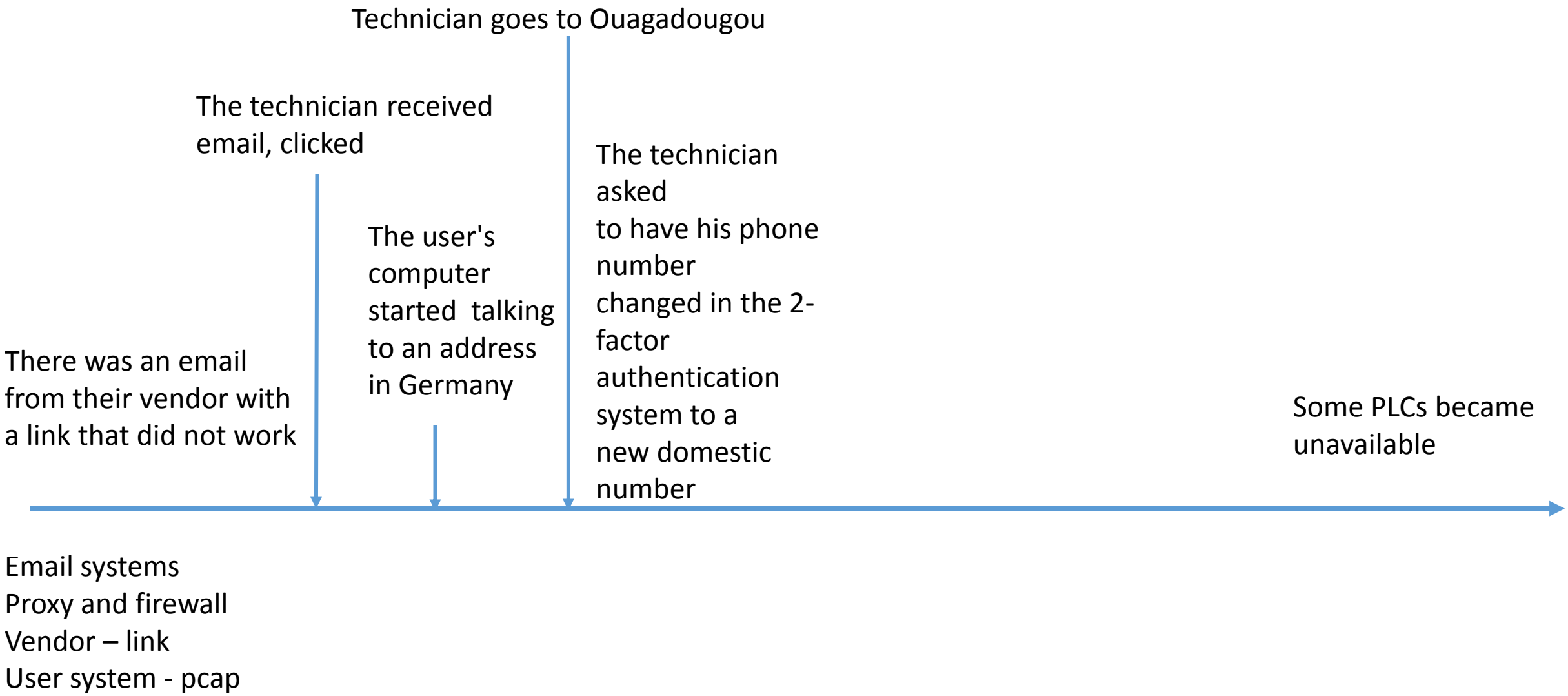
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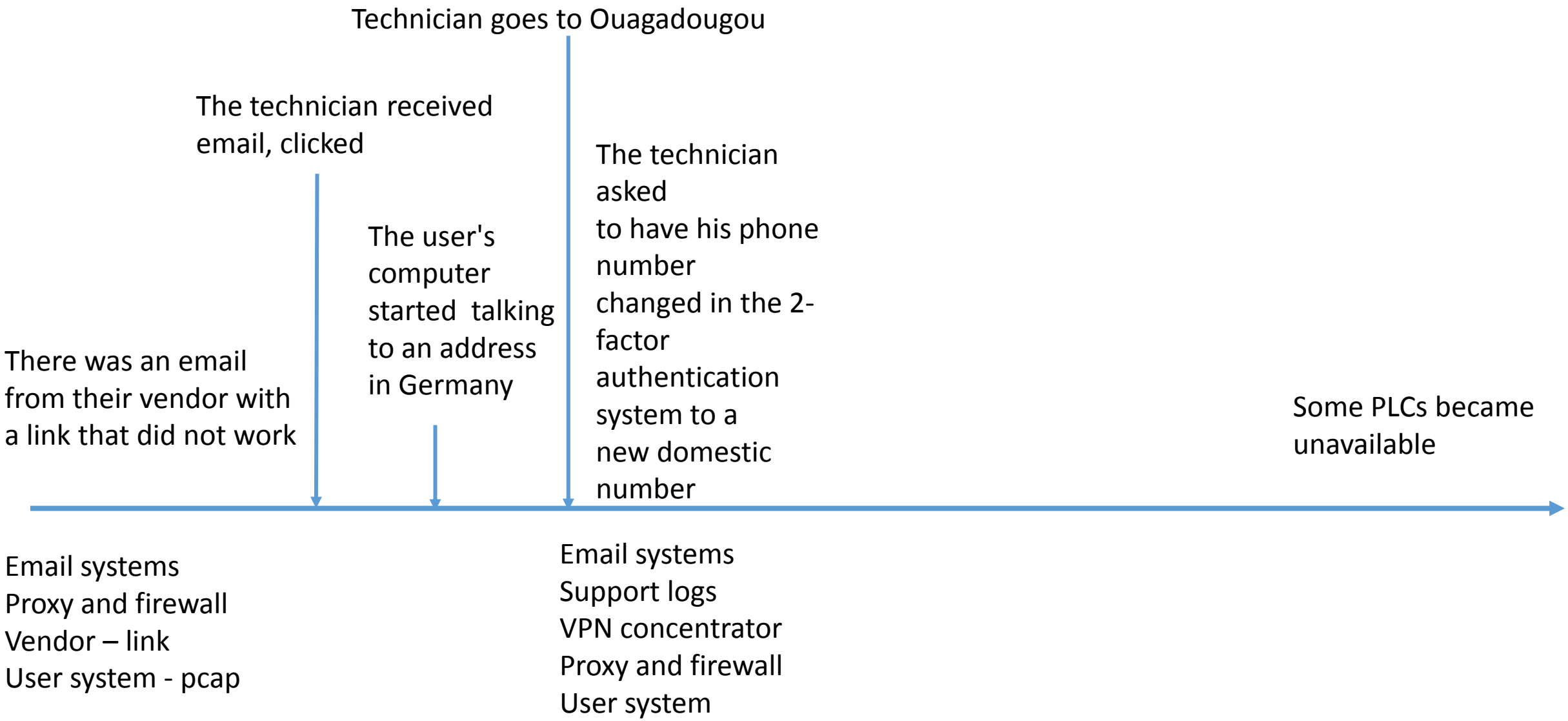
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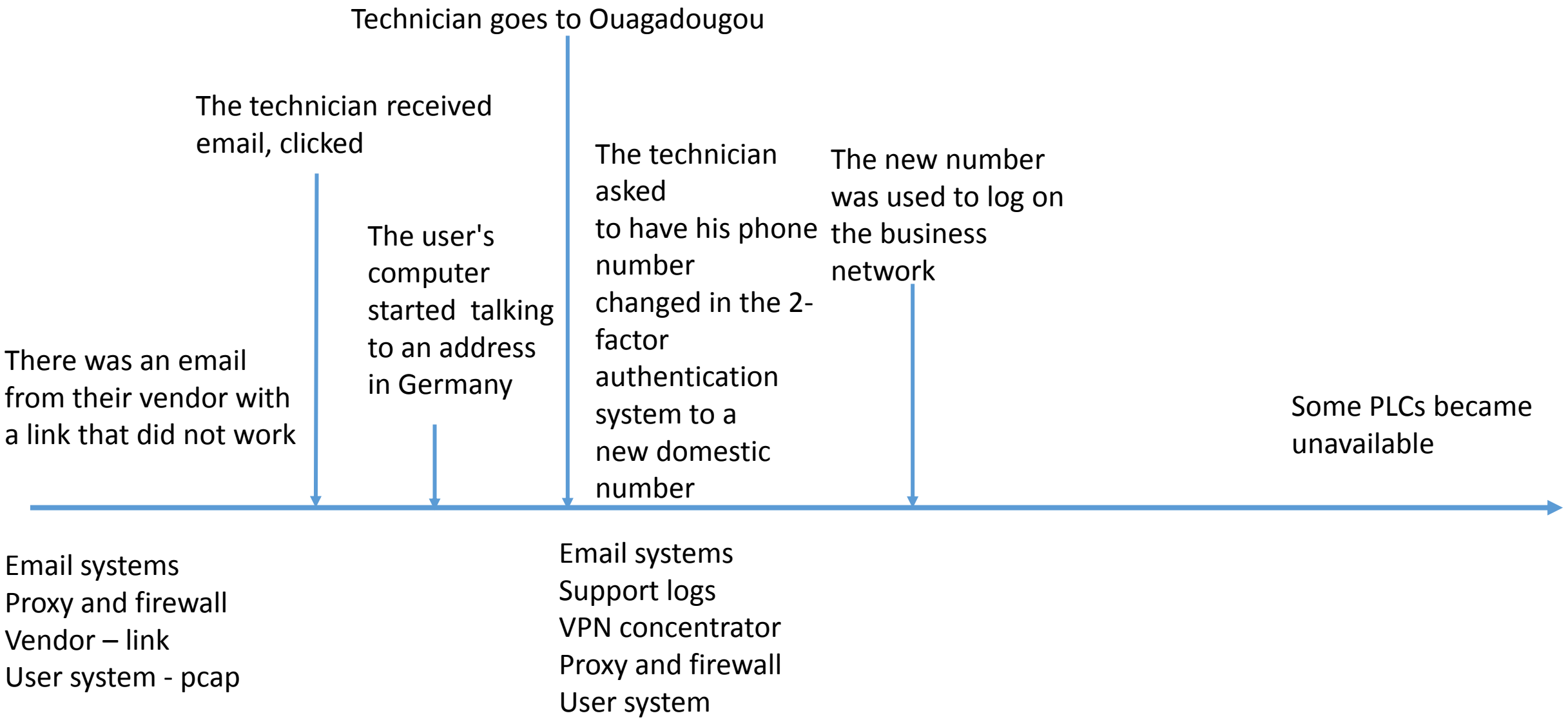
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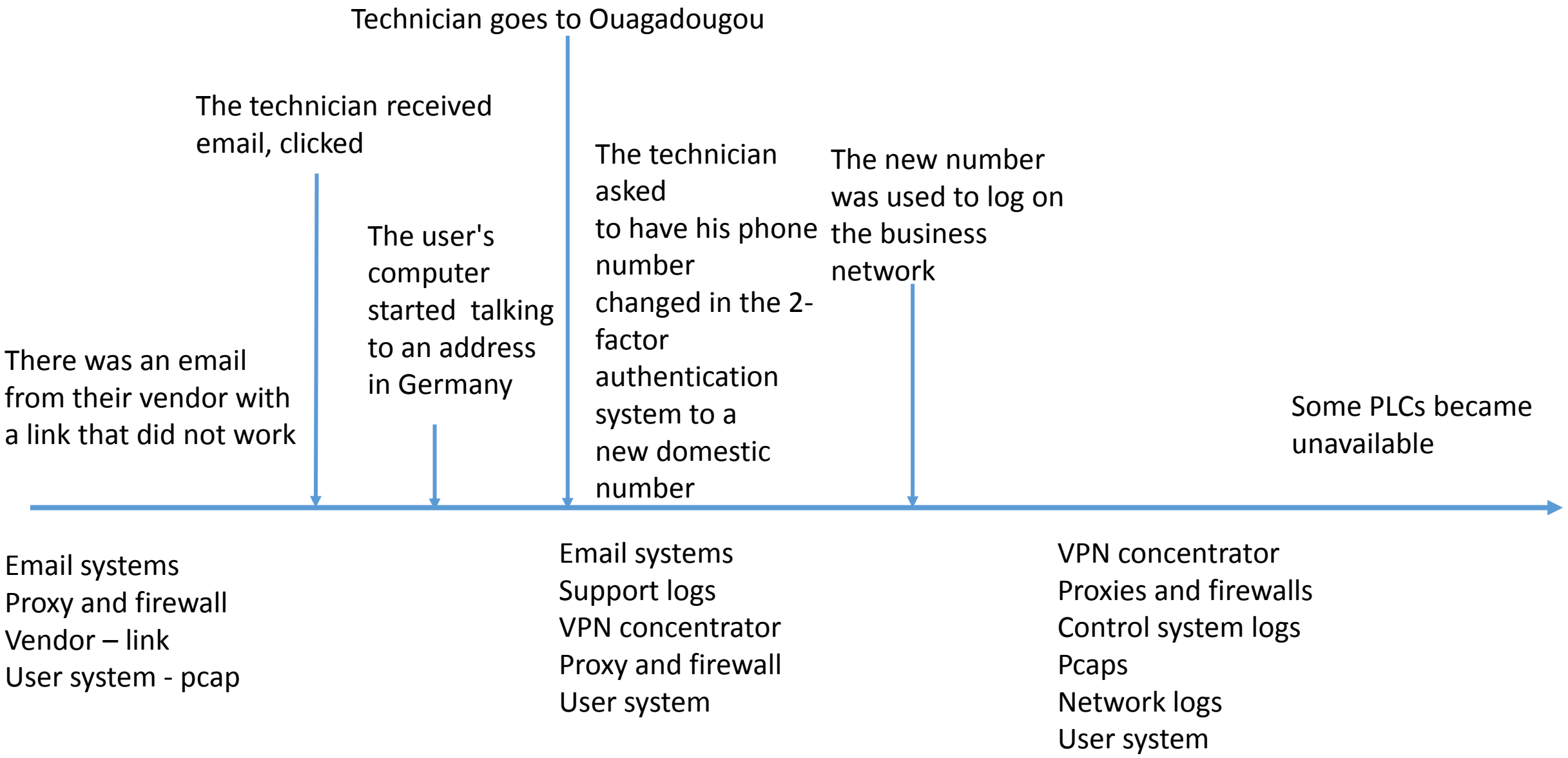
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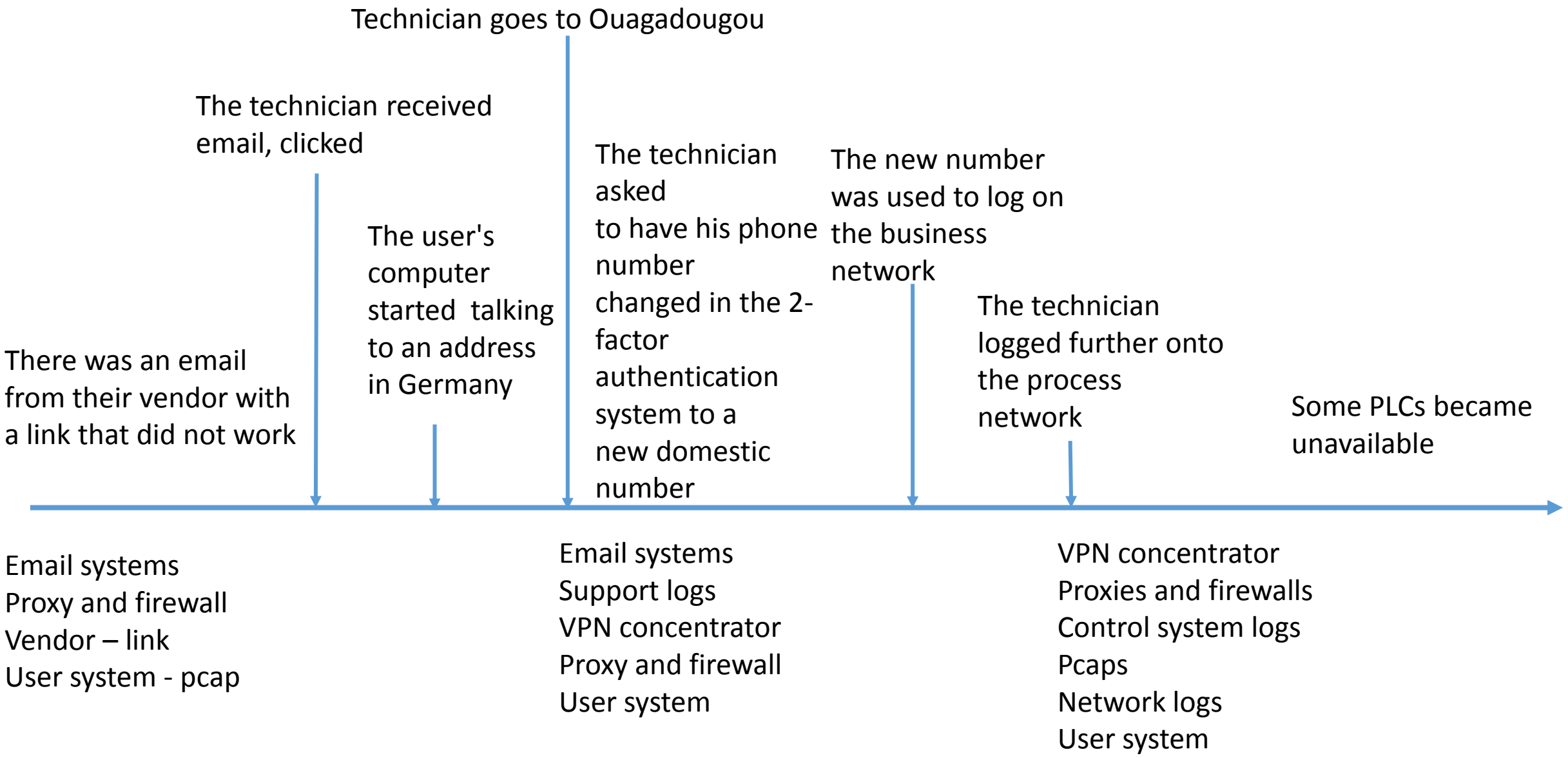
Pcaps
Network logs
User system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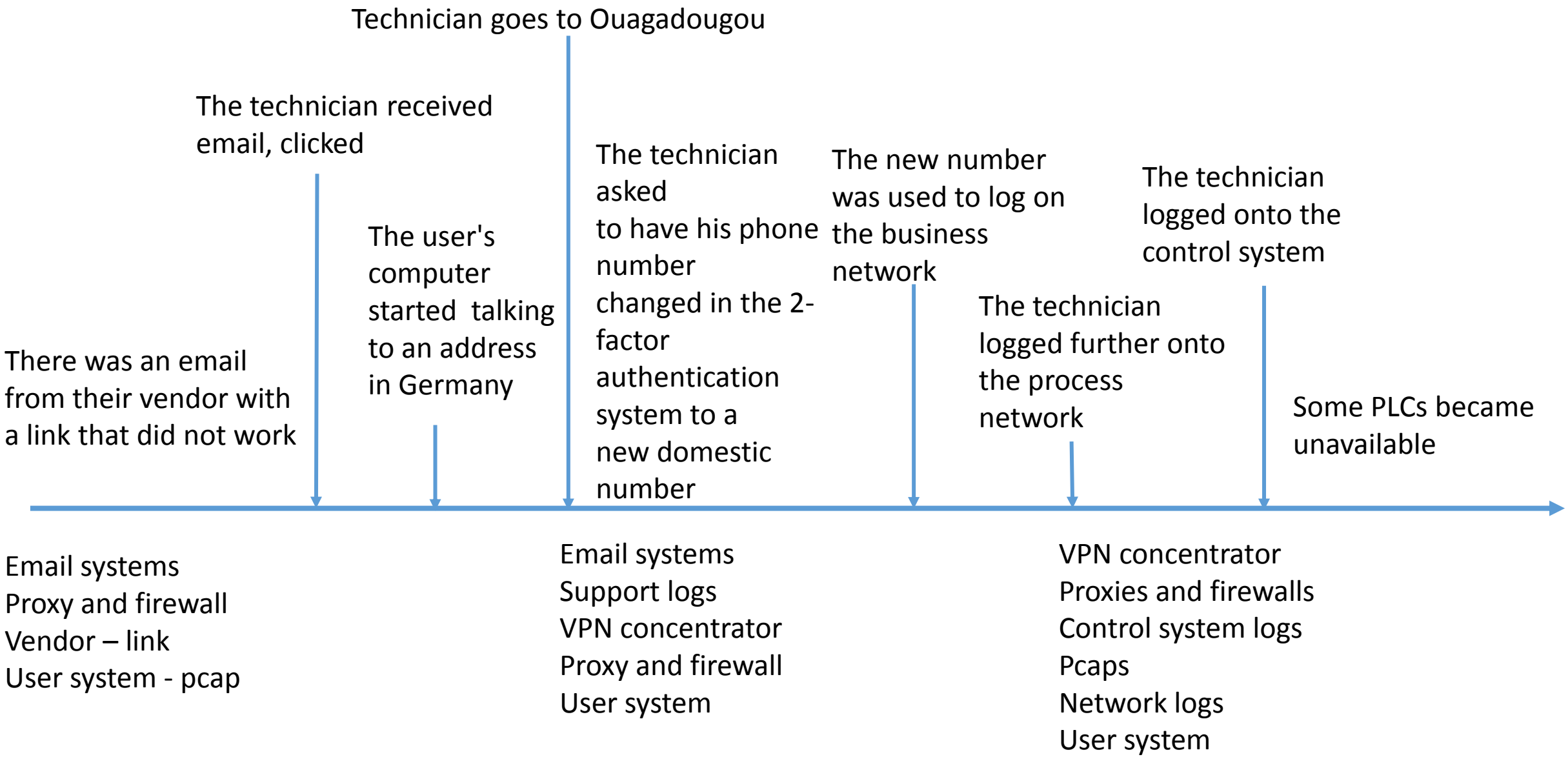
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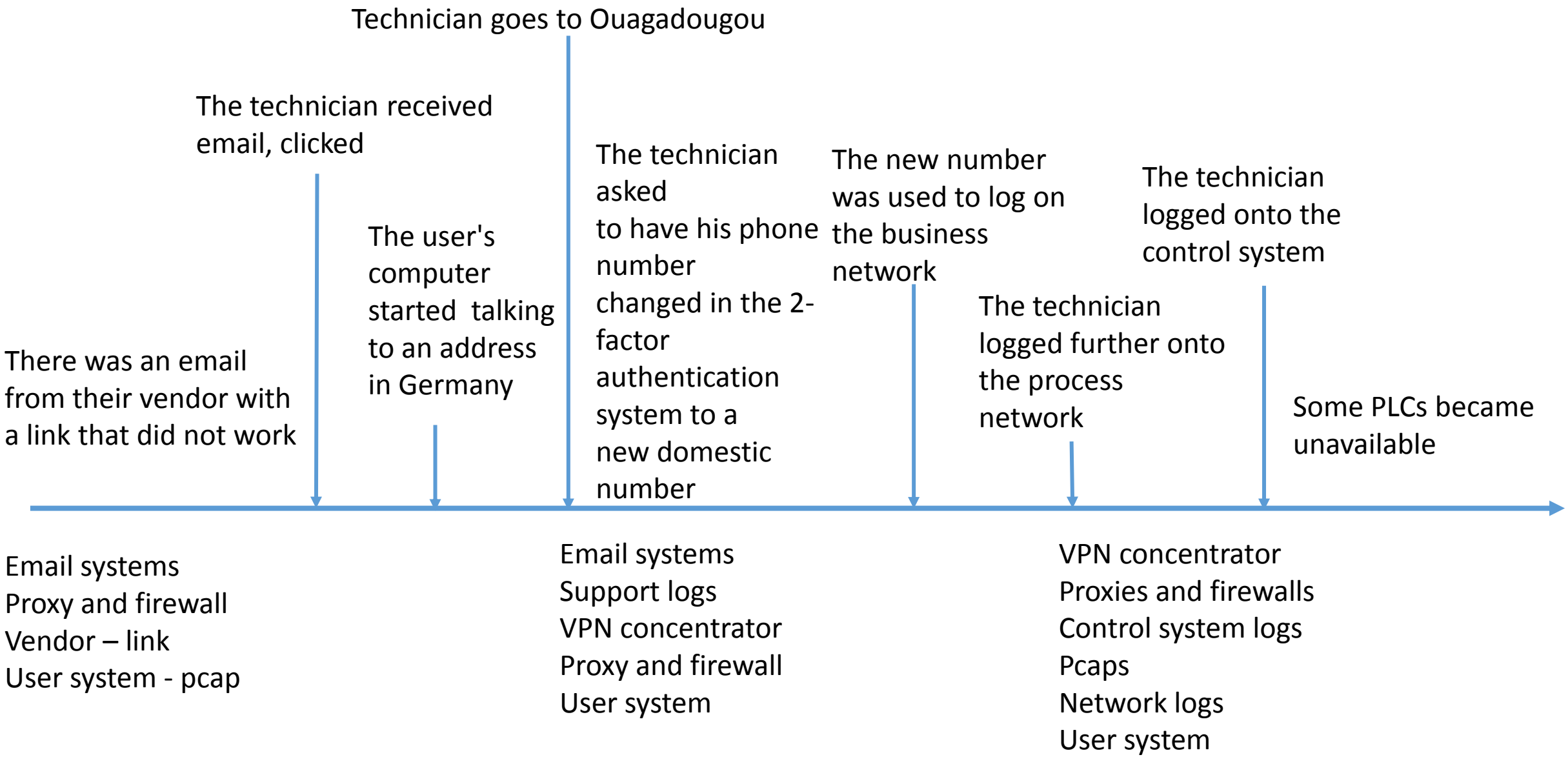


Evidence:
Statements, logs, pcap, forensic images from user, vendor and possibly control system

The answer should be "yes" to these questions

- Can you fire up packet capture?
  - Corollary: do you have active taps, span ports or a hub?
  - In the process network?
- Can you do a forensic image?
  - Corollary: do you have somewhere to store it?
- Can you capture volatile data?
- USB forensic tools ready

Information plans

- To keep people happy
- To build trust
- To leave the team working uninterrupted
- To create predictability and standards
- Do not release info too soon. It may be plain wrong.

Information list

- Systems owner
- Several levels of management
- Emergency team/disaster recovery/business continuity
- Legal department
- Communications
- Regulatory authority
- The public

Being lazy

Automation

- If you're going to do this again, you need to automate
- If you can't find somebody who can
- If you can't find anybody, team up with someone else

I need HELP!

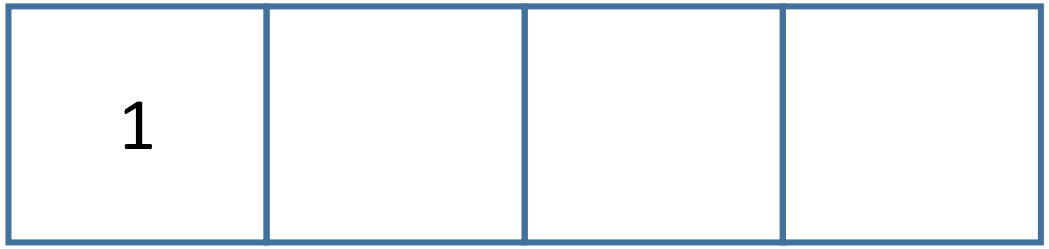
- Forensics analysis
- Reverse engineering
- Behavioral analysis
- Identifying the attacker
- Recovery is often not done by the CSIRT

The important process of lessons learned

- When you know how it happened, you know how to prevent it
- This can be powerful knowledge to share with other teams
- The measures should be part pf the lessons learned


Incident

- If the report is put in a drawer or otherwise hidden, you are back at:



Collaboration and sharing

- Some attacks happen sector wise (and technology wise)
- Some attacks happen country wise
- Attack patterns follow certain trends
- We should link up for relevant early warning and for learning purposes
- Ideally we should learn from other people's lessons as well as our own

- Questions?
- I can also be reached at margrete.raaum@statnett.no or margrete.raaum@first.org