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Forensic-Ready Information Security

Risk-Based Approach for Information Systems

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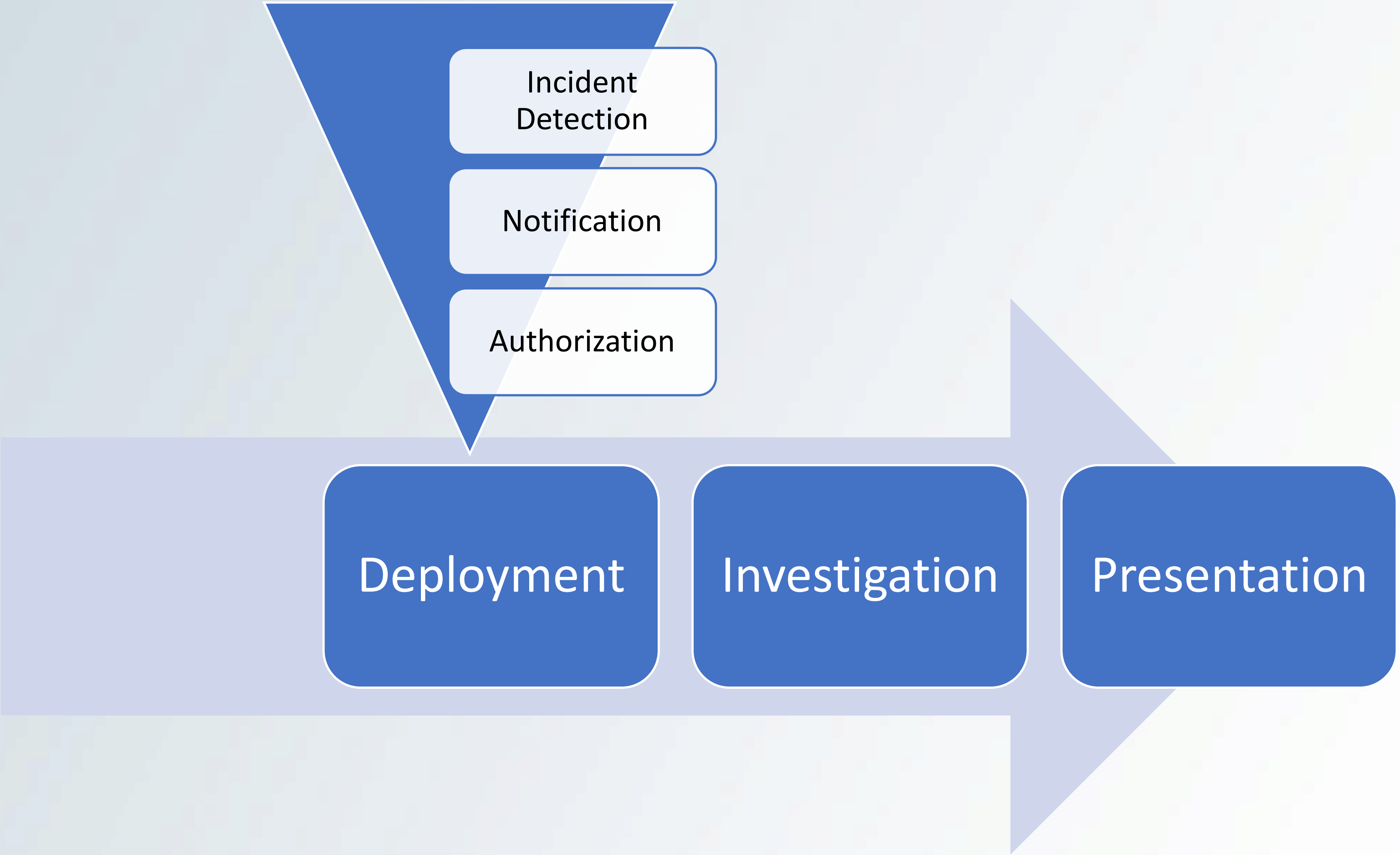
Forensics Timeline



Incident Detection

Notification

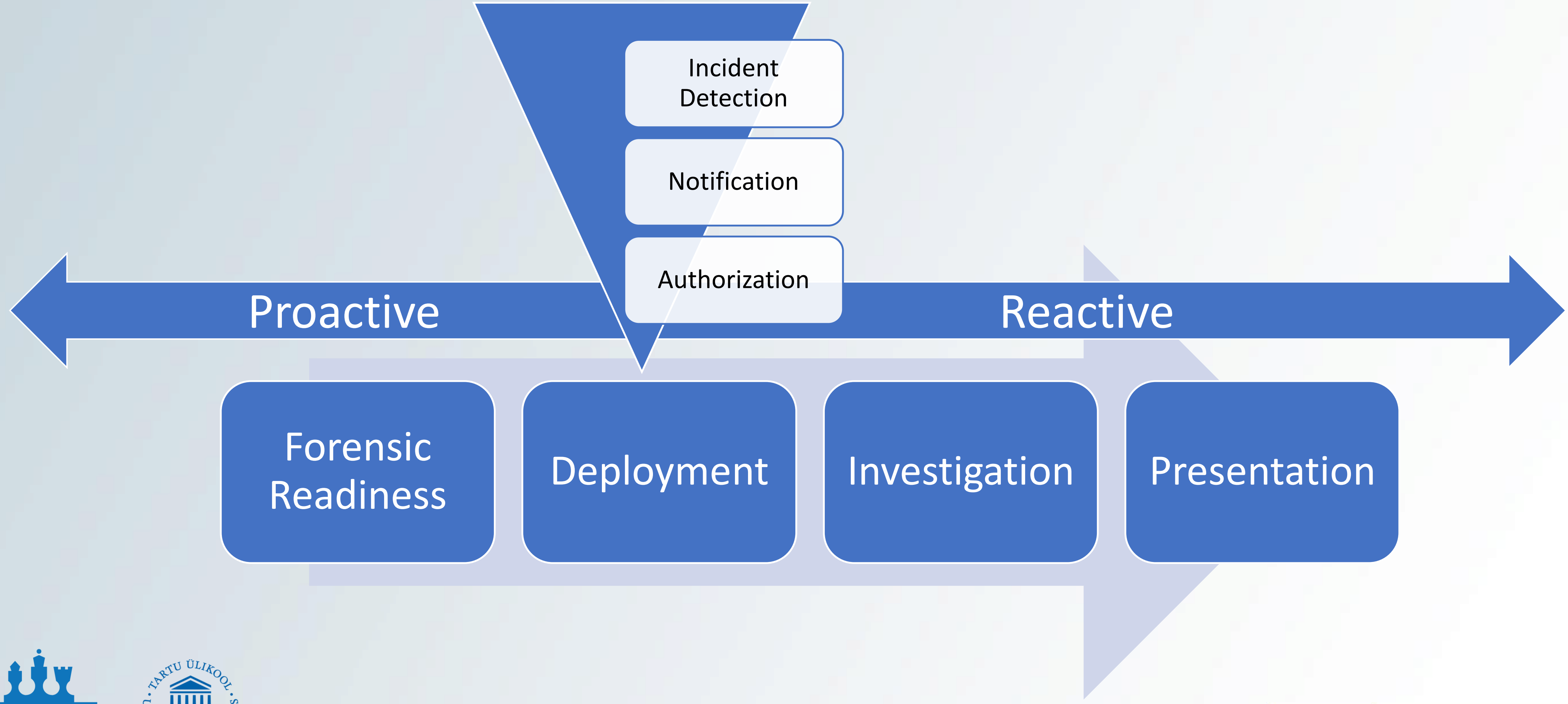
Authorization

Deployment

Investigation

Presentation

Forensics Timeline



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Forensic Readiness

- Proactive steps towards incident investigation

Incident Response

Useful Evidence

Cost Effective

- Forensic-ready systems (forensic-by-design)
  - **Prepare systems during development**
  - **Ensure rich and forensically sound evidence for future use**

WHY Forensic Readiness?

Effective Investigation

WHY Forensic Readiness?

Effective Investigation

Compliance

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WHY Forensic Readiness?

- Effective Investigation
- Compliance
- Legal Actions Support

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WHY Forensic Readiness?

- Effective Investigation
- Compliance
- Legal Actions Support
- Disclosure Orders

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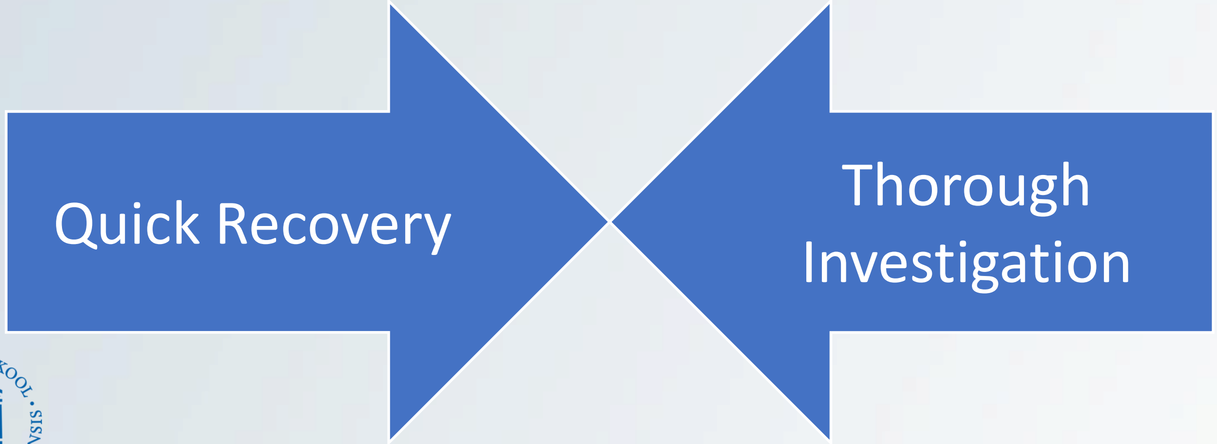
WHY ELSE Forensic Readiness?

- Security – Not IF, but WHEN
- Insight – What? When? Where? Who? How?
- Softening the incident response dilemma



Quick Recovery

Thorough Investigation

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HOW Forensic Readiness?

Organisation

- Strategy
- Policy
- Staff Training
- Documentation

Technology

- Evidence Preservation
- Secure Storage
- Evidence Production
  - Logs
  - Audit Trails

Forensic-Ready Information Security

1. Forensic readiness complements security
2. Risk assessment to guide implementation
3. Building forensic readiness on top of information security

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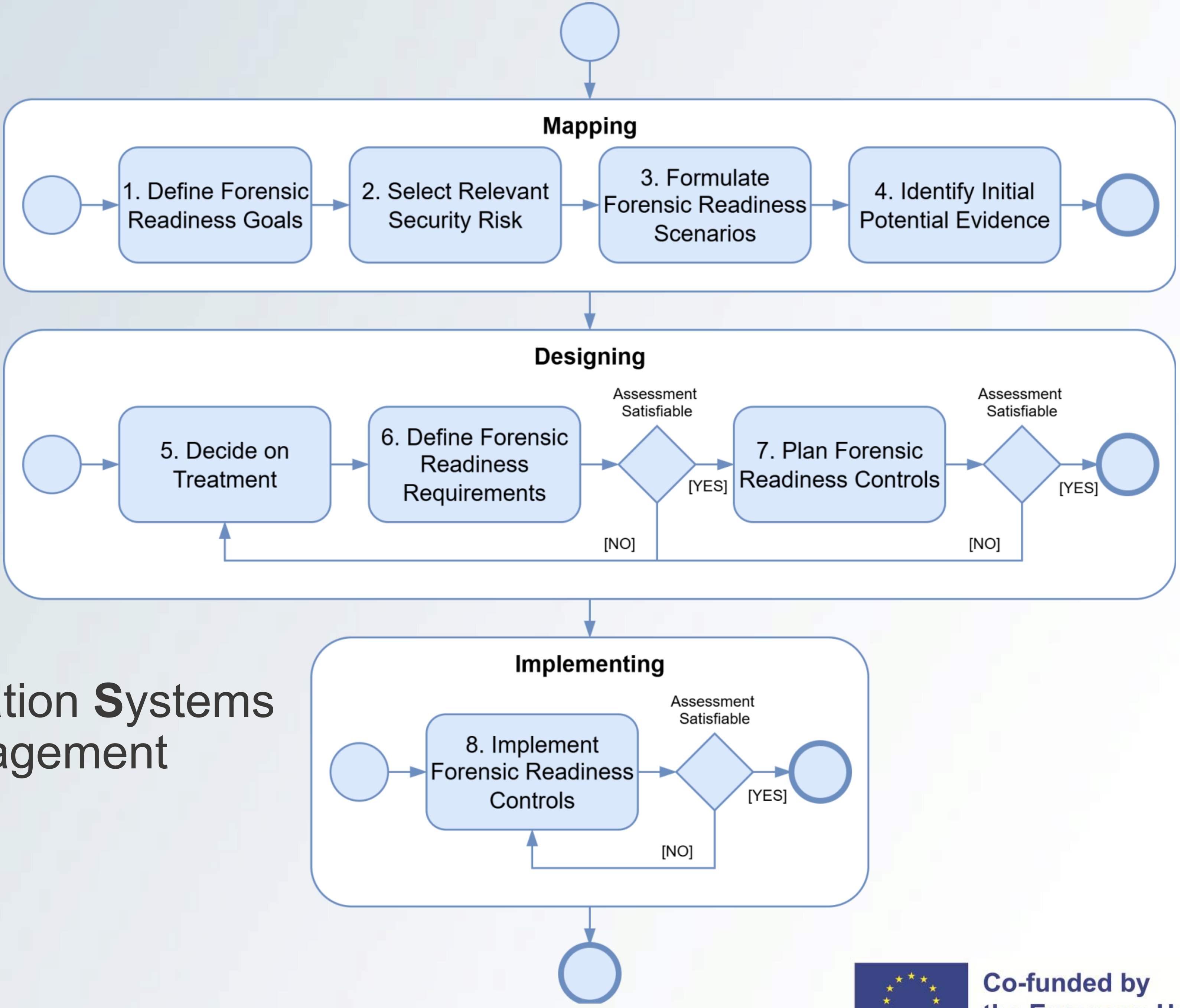
FR-ISSRM Process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5. Decide on Treatment
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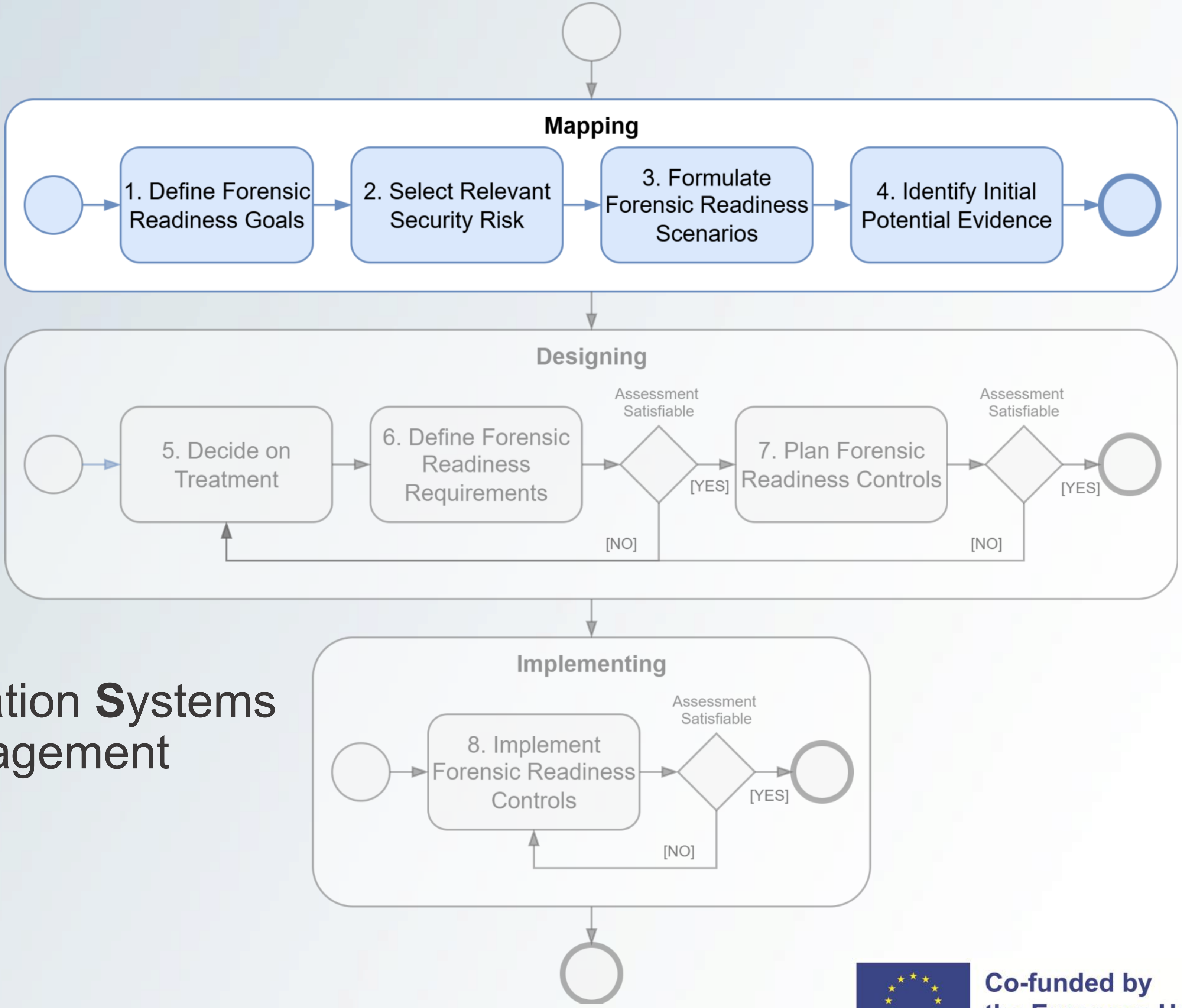

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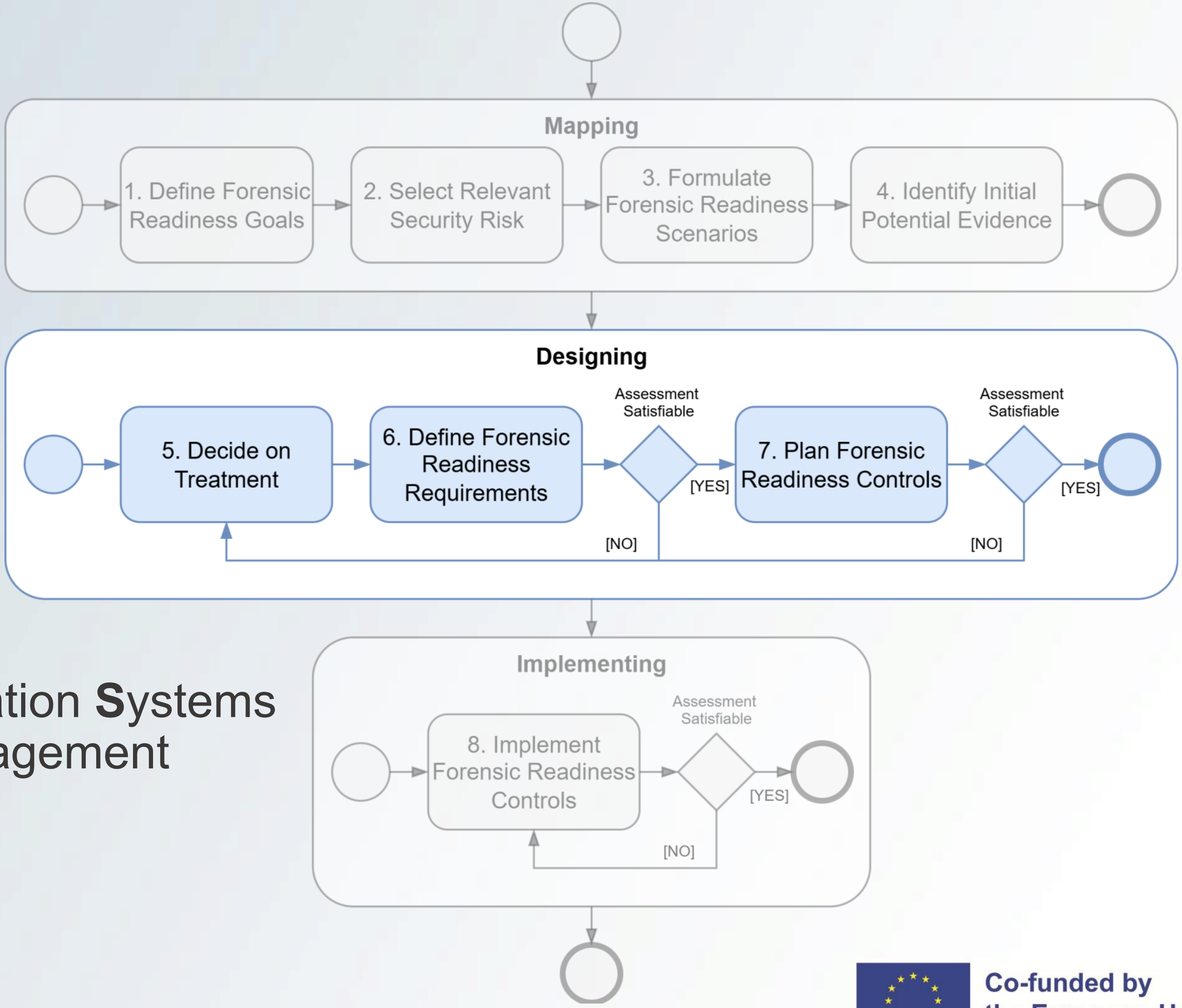

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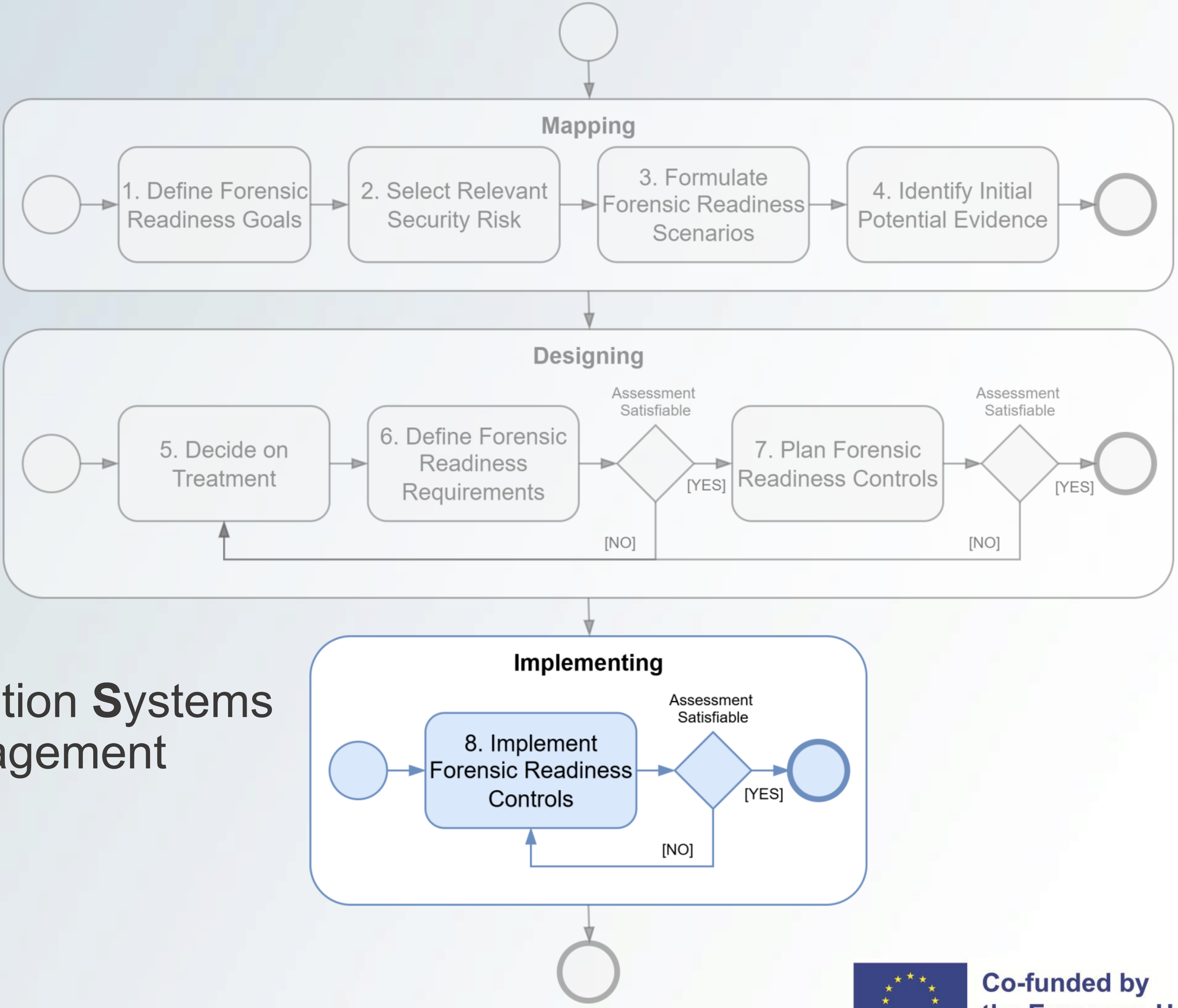

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Example Implementation – SensitiveCloud

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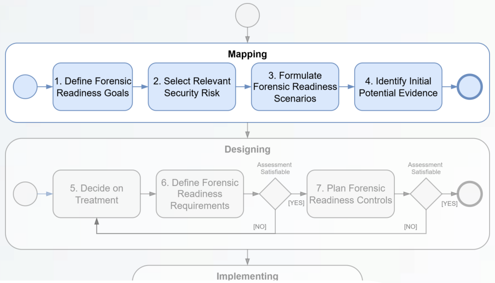
Sensitive Cloud

- Platform for storage and processing of sensitive data
  - Supporting life sciences research
  - Strong security needs
  - Build on Kubernetes (K8s), accessible by VPN

- Aspiring for ISO/IEC 27k certification

- Interested in systematization of “logging”

Sensitive Cloud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Forensic Readiness Goals

Prove access to user data

Enable investigation of logical perimeter access process breach

Prove misuse of user identity

Enable evidence release of perimeter access process

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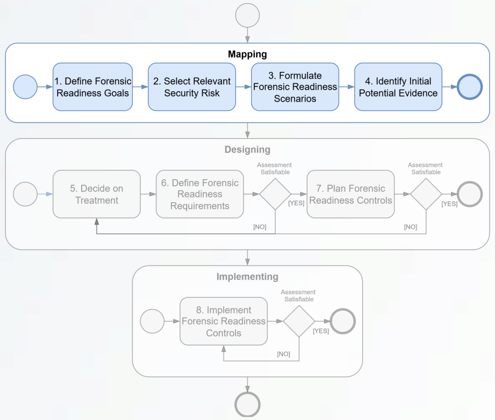

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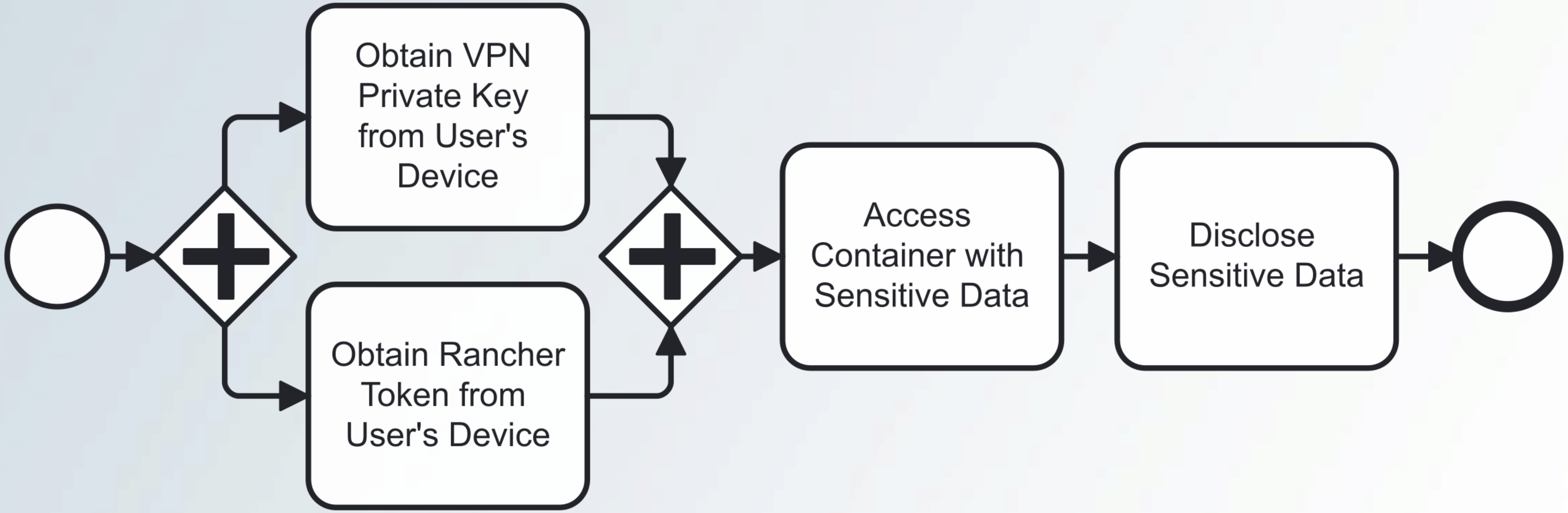

Obtain VPN Private Key from User's Device
Obtain Rancher Token from User's Device
Access Container with Sensitive Data
Disclose Sensitive Data

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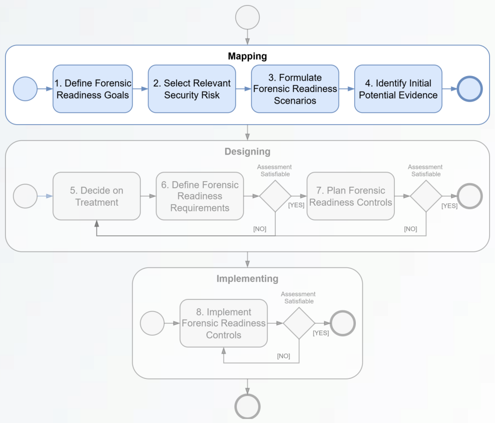
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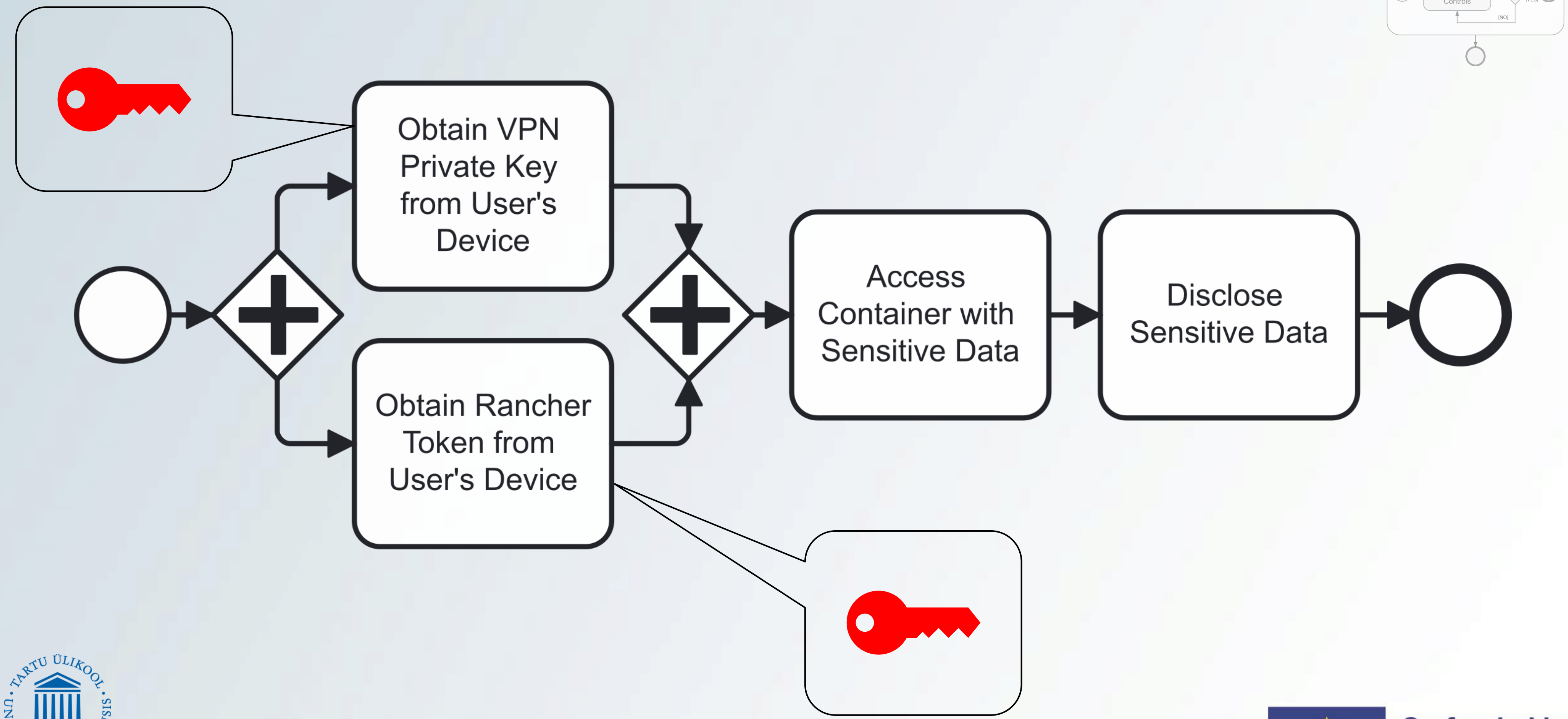
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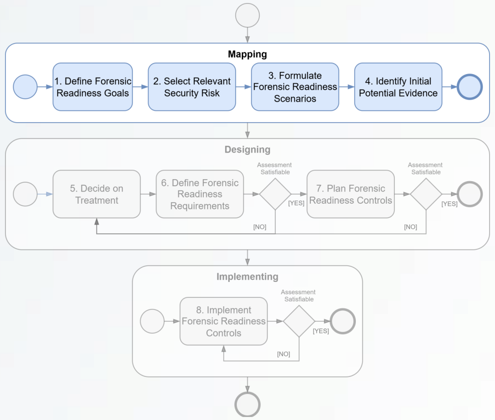
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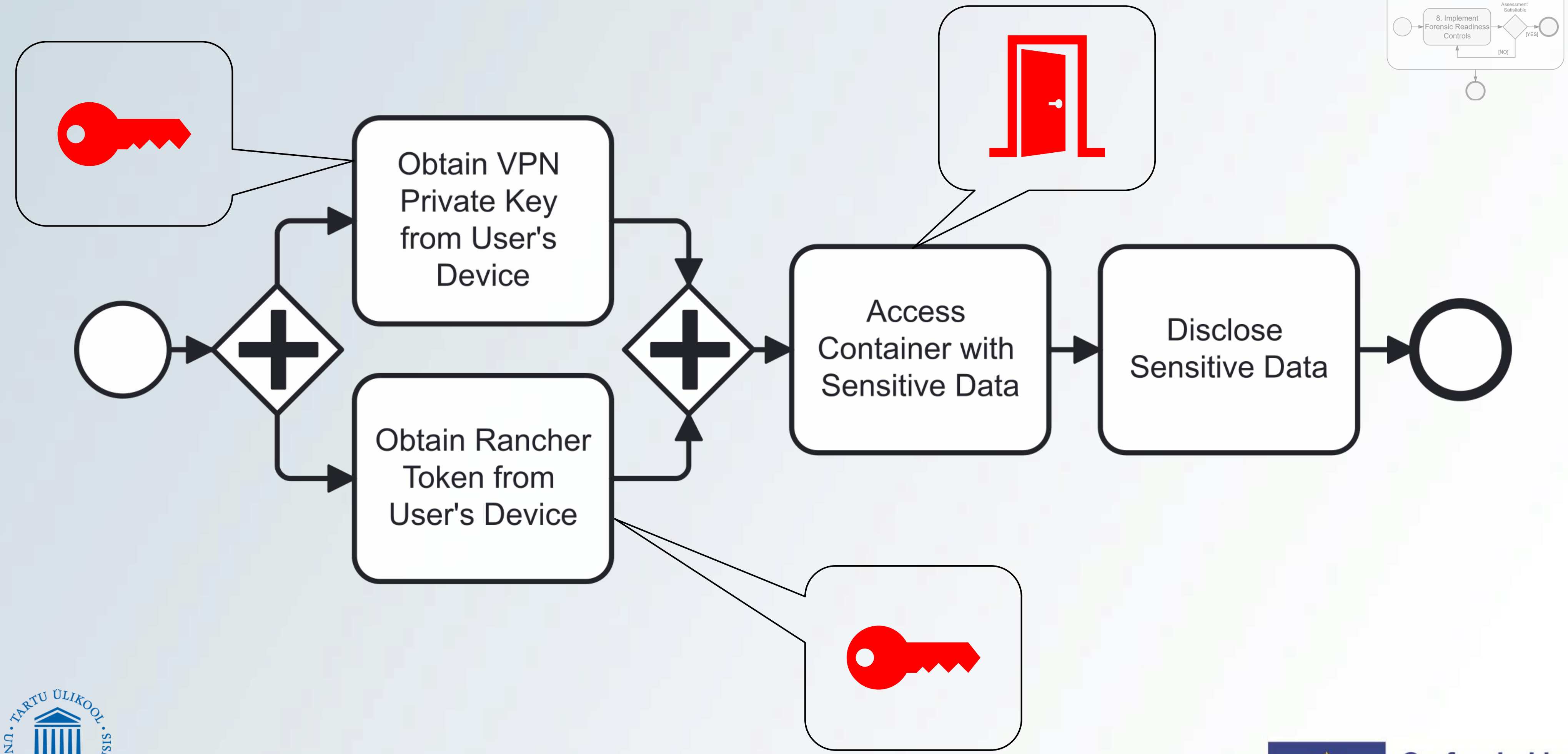
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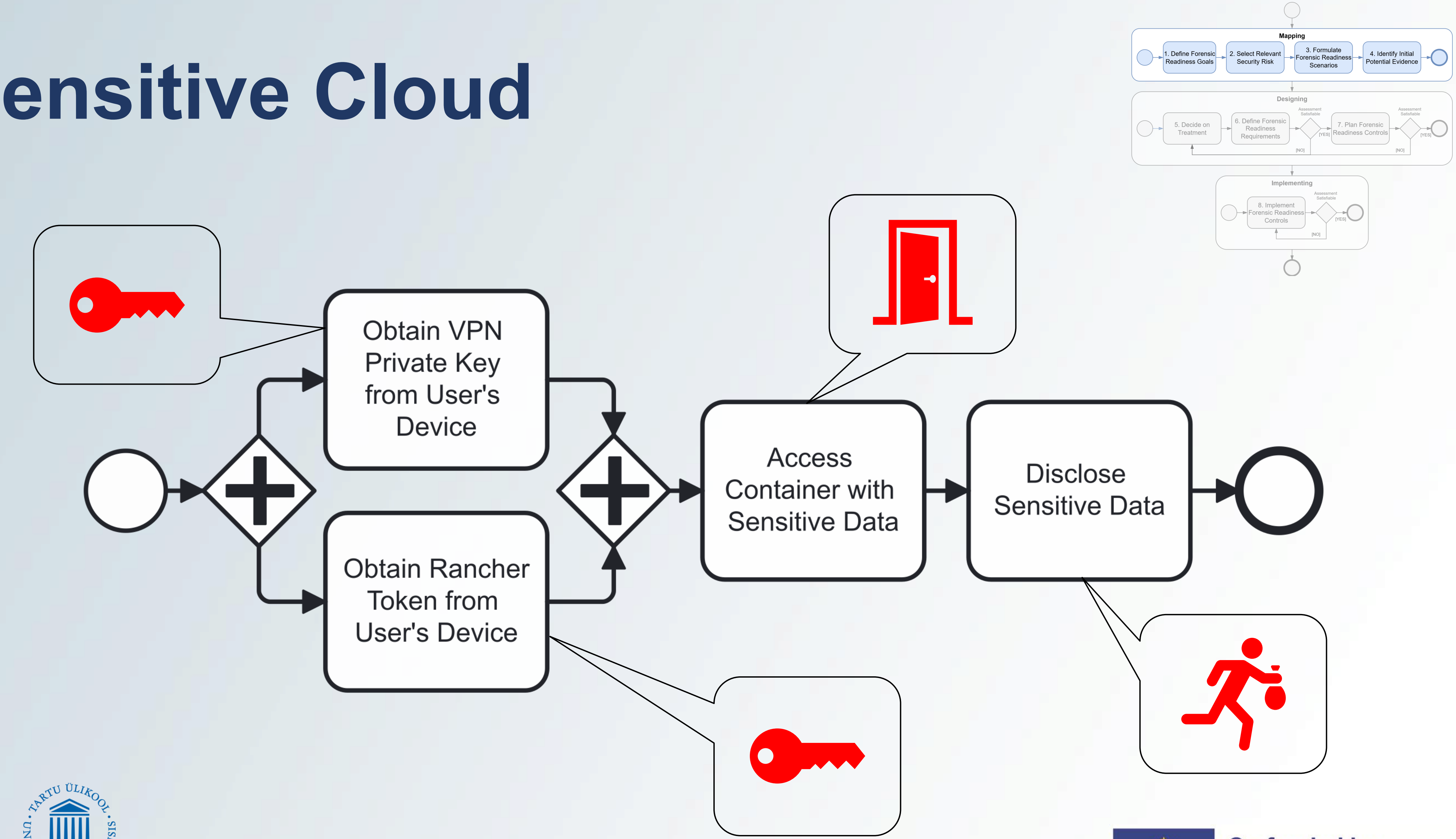
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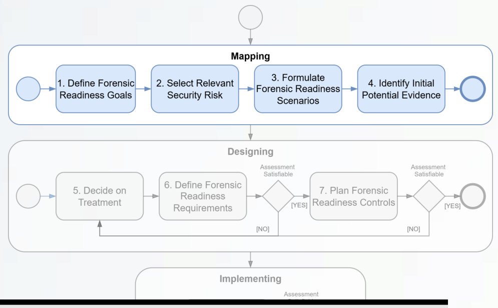
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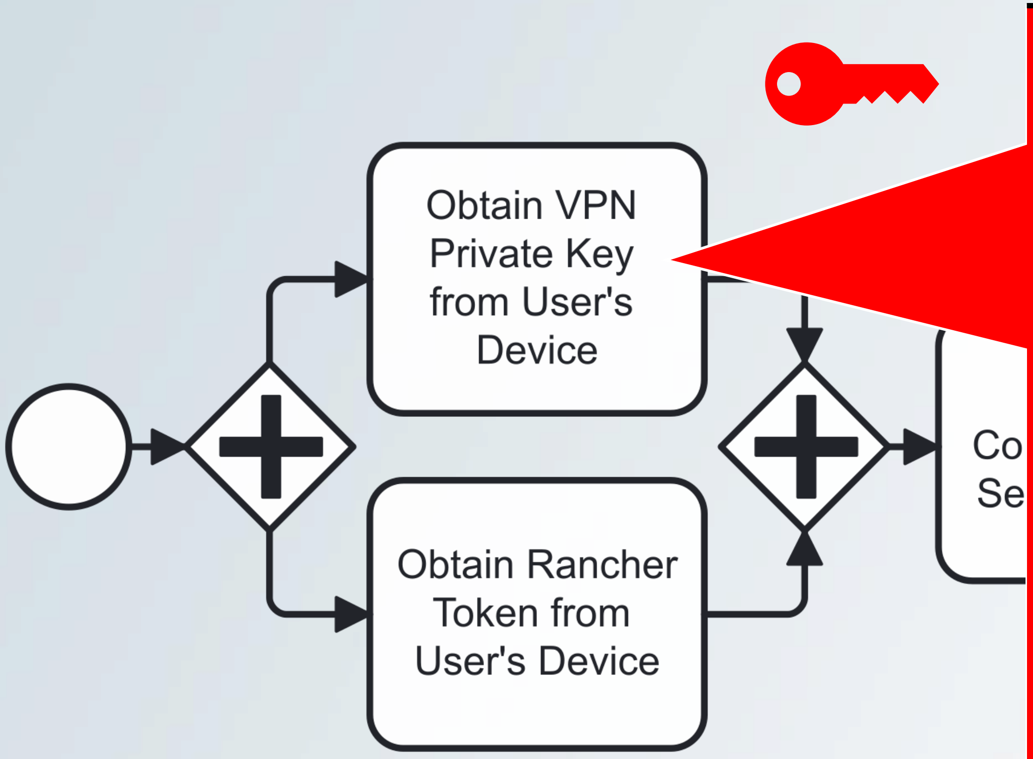
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Vulnerability	1. VPN key is unprotected on User Device 2. VPN key is sufficient to access internal network
Threat	An attacker with the capability to access the VPN key on a User Device steals the VPN key and then uses it to access the Internal Network
Impact	1. Loss of User Identity integrity 2. Breach of Perimeter Access Process
Goal	Enable investigation of logical perimeter access process breach

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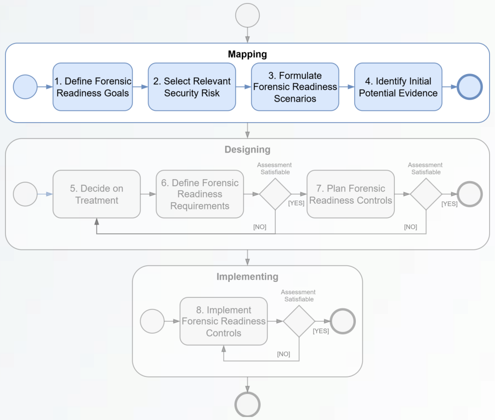
Scenario Modelling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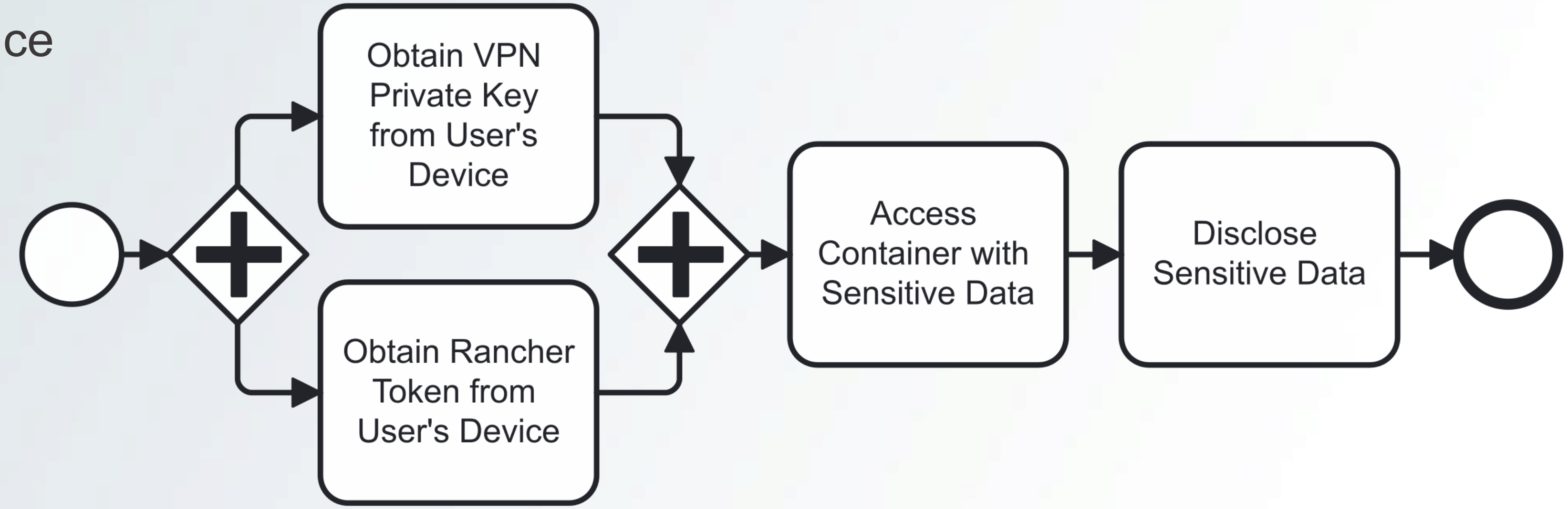
- Capture scenario as a business process

- Mapping phase
  - Enumerating known evidence

- Designing phase
  - Alternatives
  - Analysis
  - FREAS tool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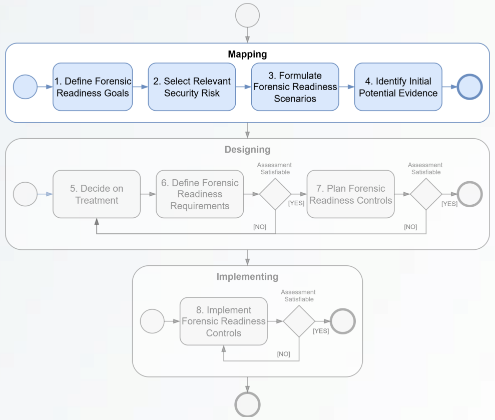
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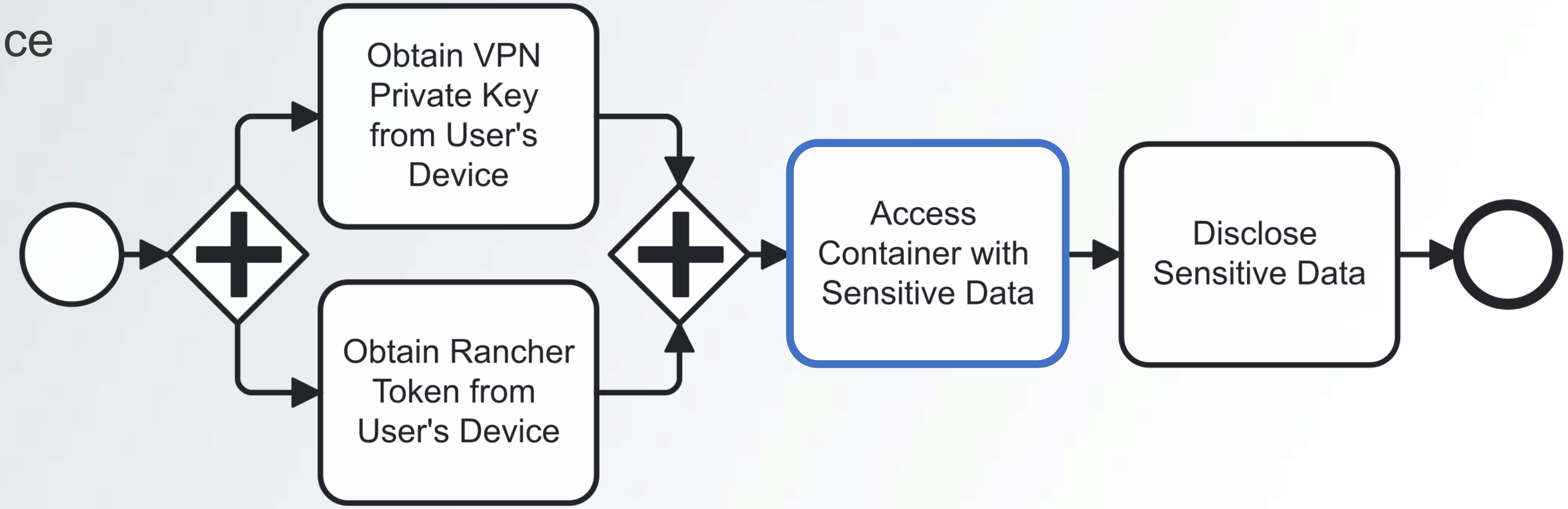
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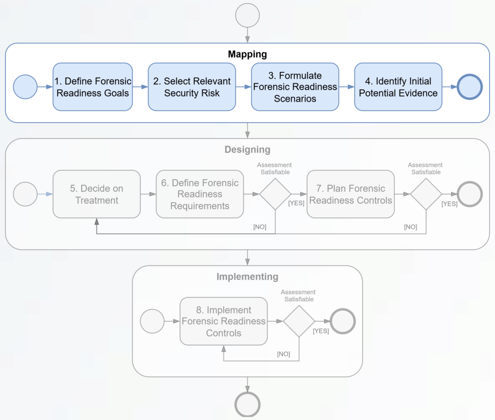
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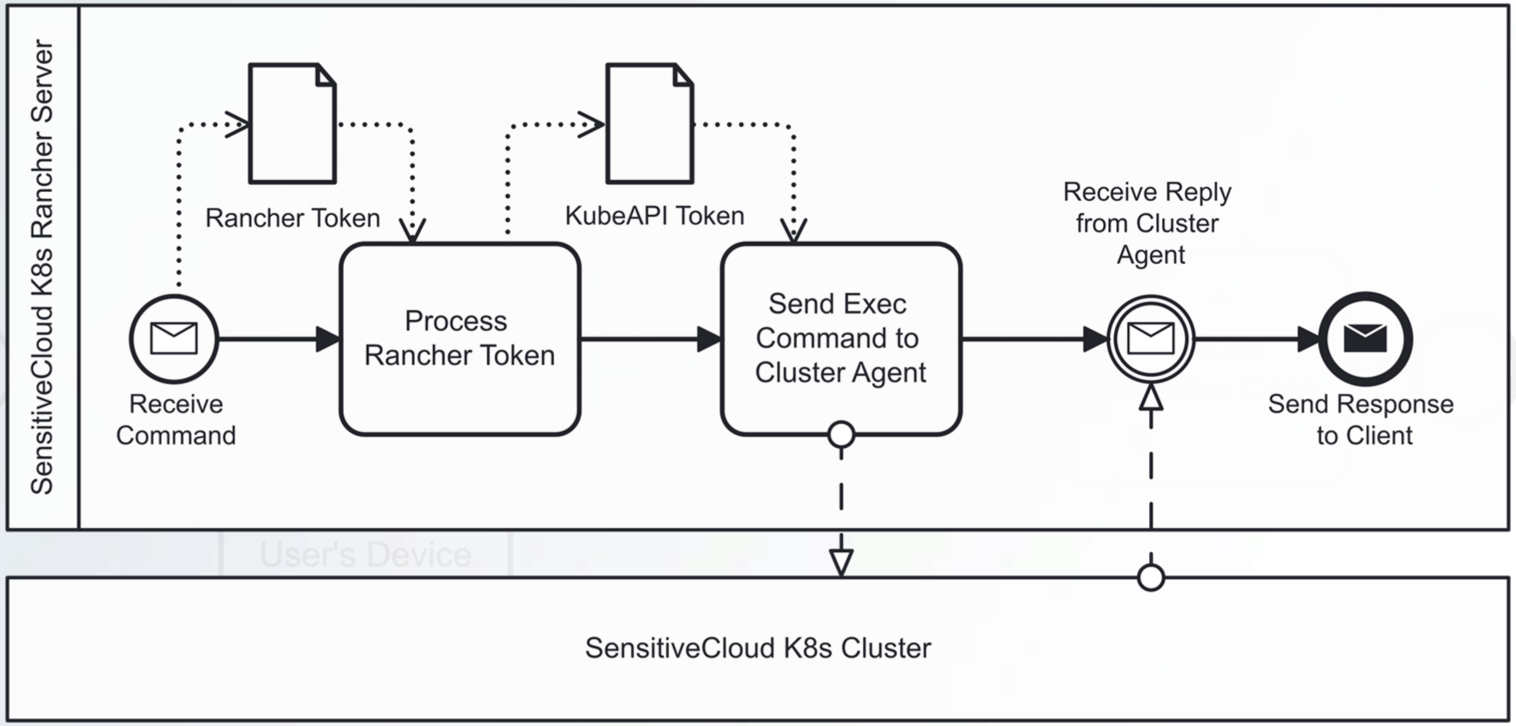
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Rancher Token
KubeAPI Token
Receive Reply from Cluster Agent
Receive Command
Process Rancher Token
Send Exec Command to Cluster Agent
Send Response to Client
SensitiveCloud K8s Cluster

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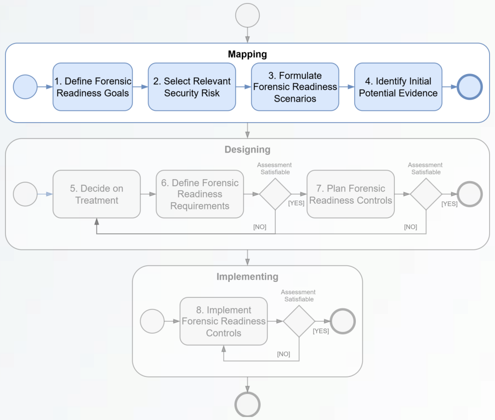

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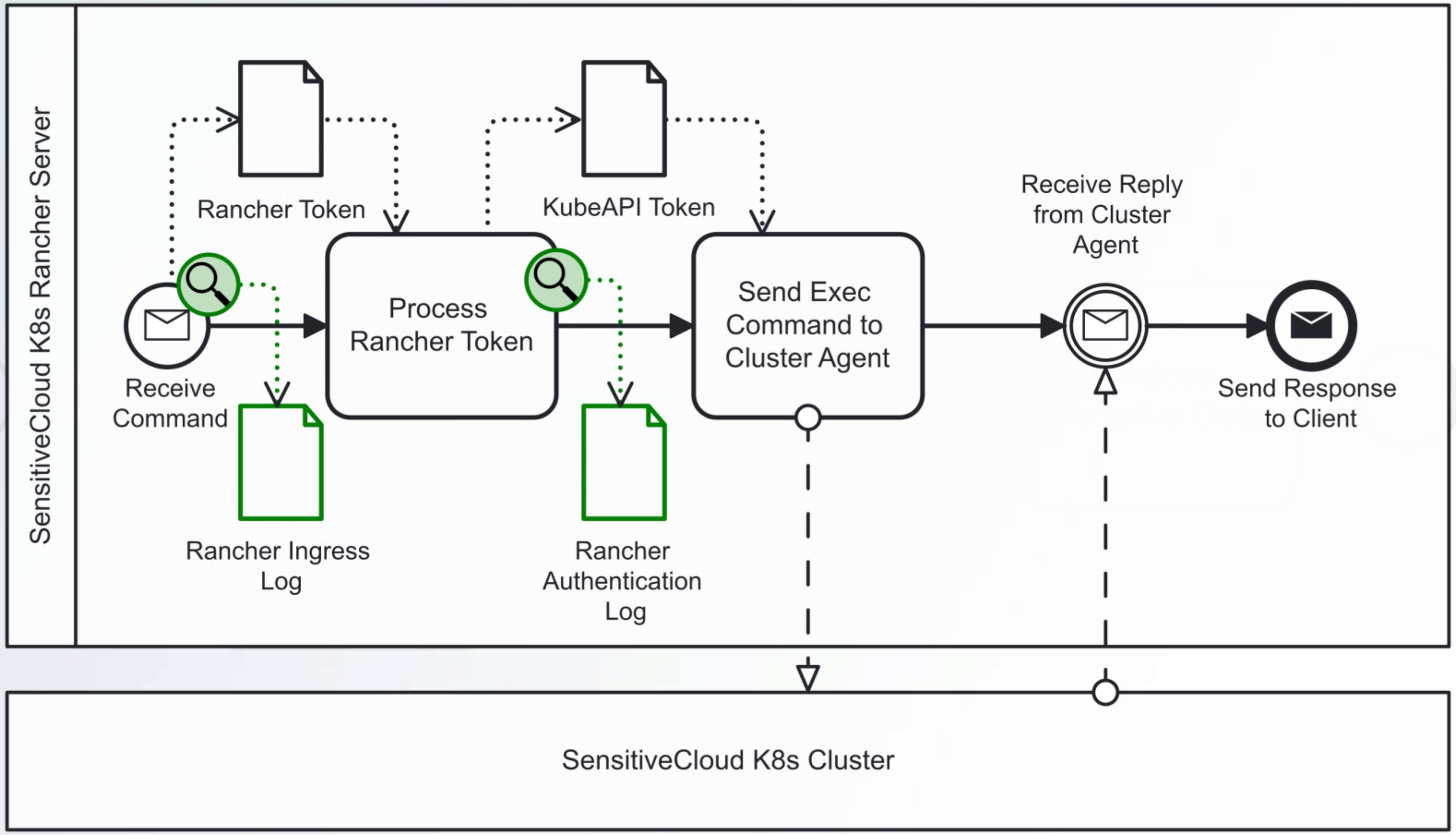

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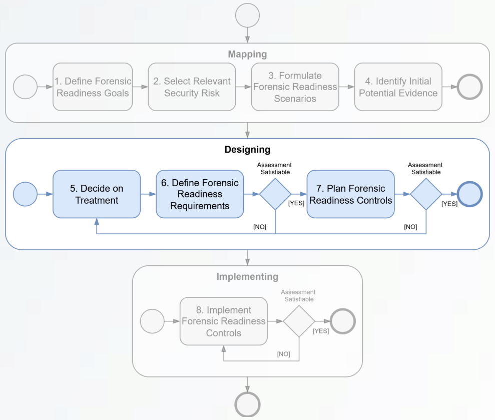
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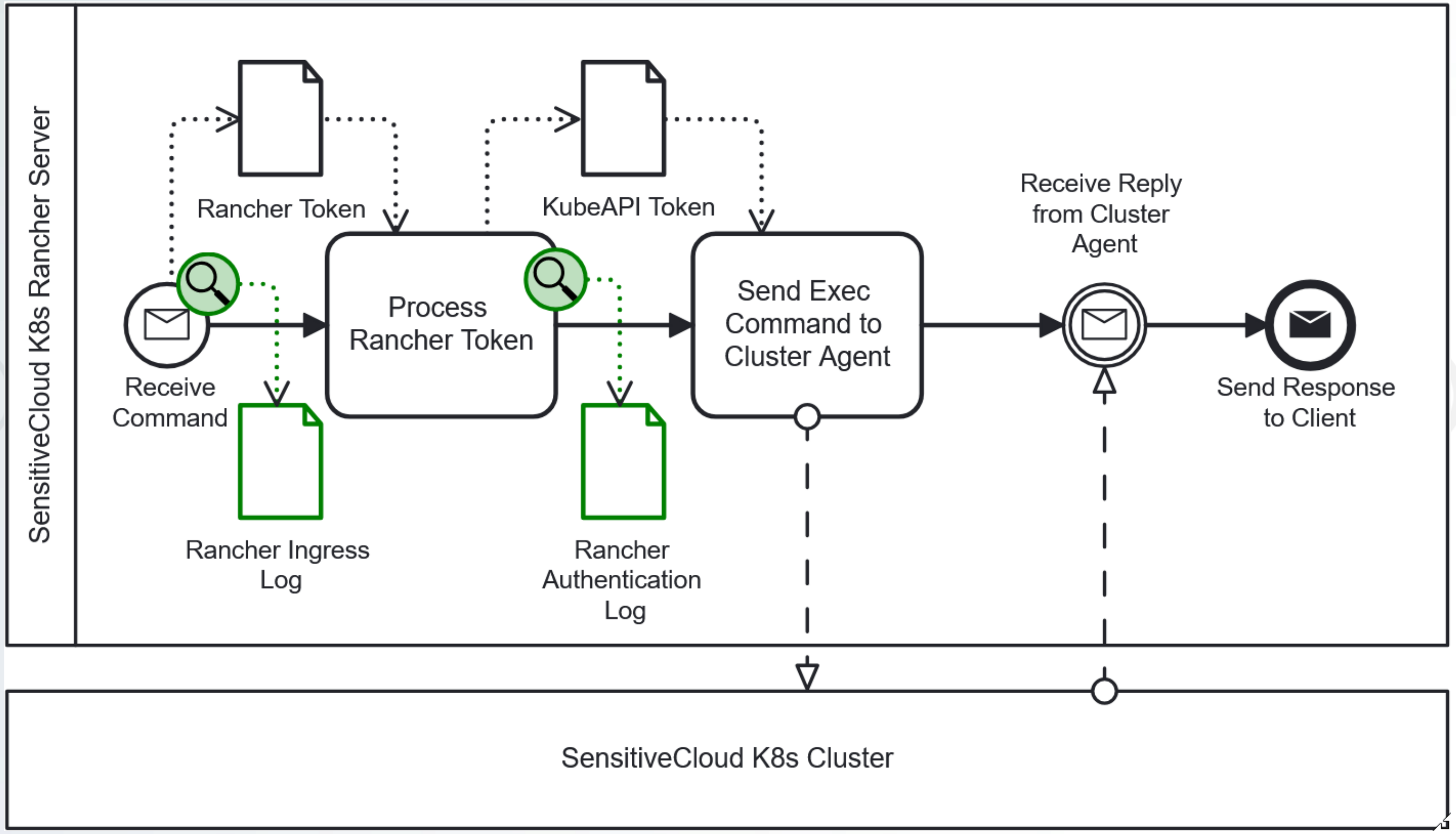
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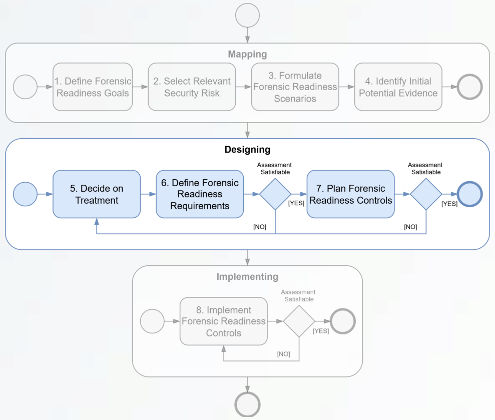
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- Simulated incident evaluation
  - Simulate attack based on the scenario
  - Activates incident handling plan
- Investigation uncovered serious issues
  - Some avoidable
- Practical complement to ISO/IEC 27k certification

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Conclusion

- Forensic readiness is a complement to information security

FR-ISSRM Method

https://frssdesign.github.io/

Tool

https://freas-tools.github.io/wiki/

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