Norsk Regnesentral
NORWEGIAN COMPUTING CENTER

Plans for the next year

Norwegian Computing Center

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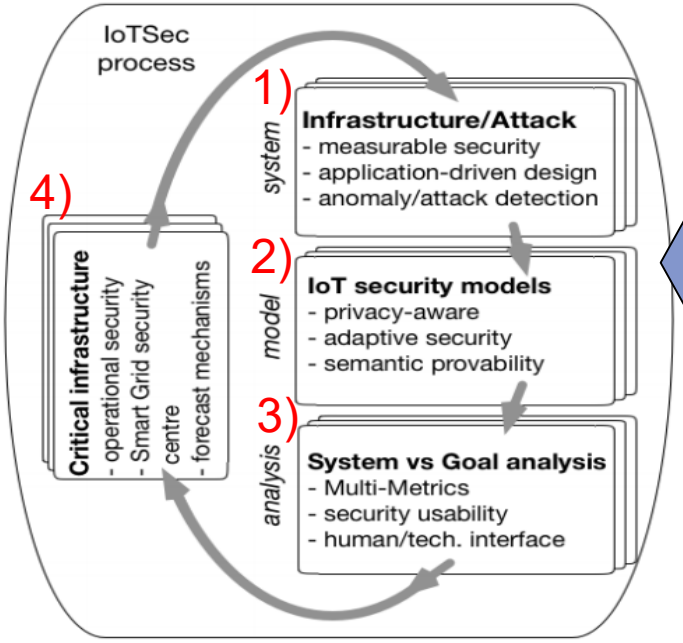
24.10.2019

Goal: Safe and secure IoT-enabled smart power grid infrastructure

IoTSec process



NR's contributions

1) attack detection, real-time security analytics, ML
2) optimised adaptive security models
3) ?
4) adaptive data collection framework for real-time security analytics

Case Studies

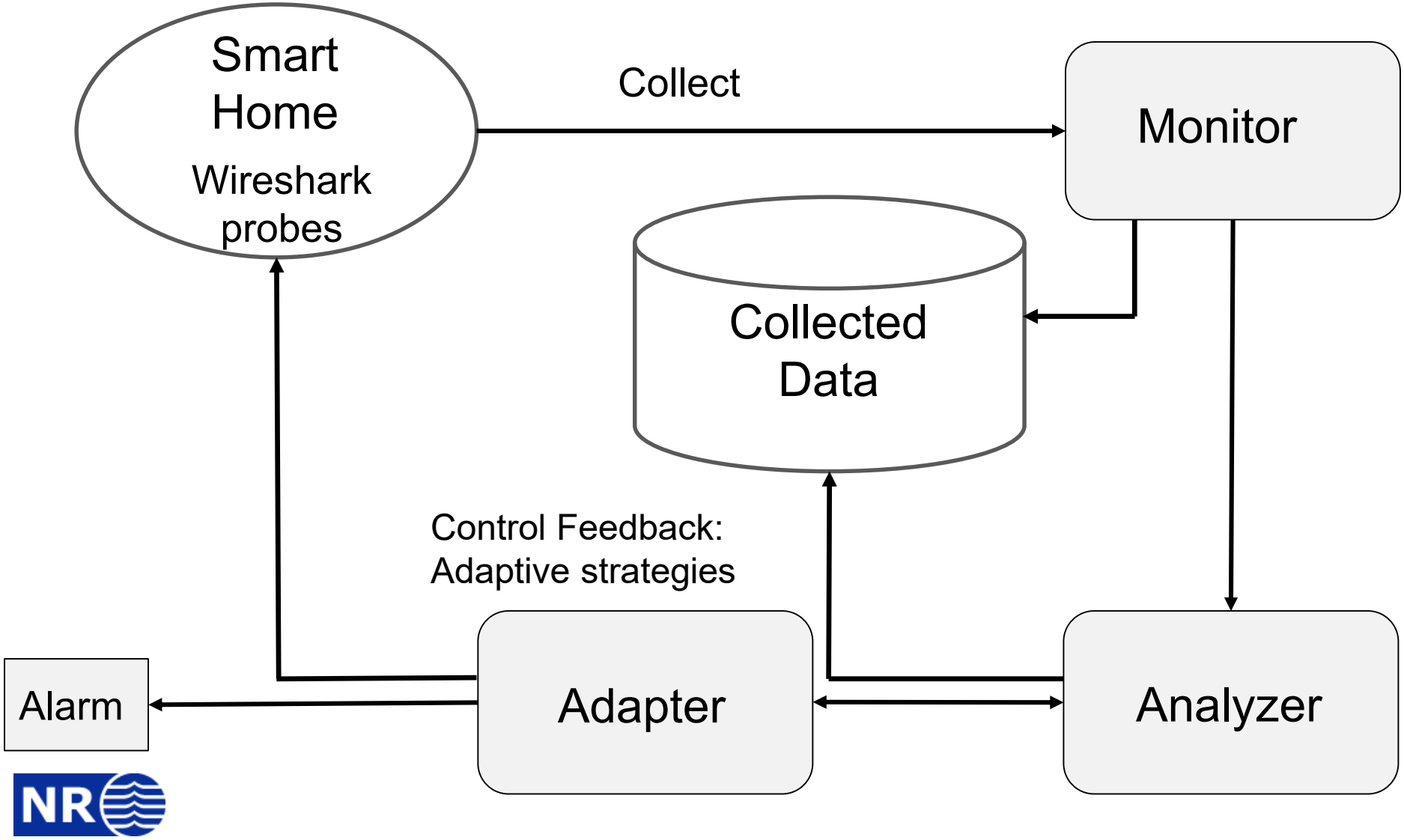
- Smart home
- Smart Grid / AMI (advanced metering Infrastructure)

- validate using smart home case
- contribute to monitoring of smart grid

Adaptive data collection

- detect security threats and prevent attacks
  - monitor & collect different categories of data
  - data analytics
- improve collection efficiency
  - reduce the amount of collected data /collect relevant data that reflect the current state of the system
    - environmental sensors / other sources
  - ensure detection accuracy
- adapt data collection routines to different contexts and situations

Adaptive Data Collection Framework



We need to consider

- What is the required sample rate?
- What is granularity of monitoring?
- How reliable is the collected data?
- Is there a common event format across sensors?
- How is the current state of the system inferred?
- How much past state may be needed in the future?
- What data need to be archived for validation and verification?
- How faithful is the model to the real world?
- Can an adequate model be derived from the available sensor data?

Analyze phase

- Lightweight analitics: support vector machine, k-nearest neighbors, decision tree, random forest
- Datasets
  - KDDCUP
    - Accuracy random forest: 0.999185185185185 2
  - UNSW-NB15
    - Accuracy SVM: 0.720092009961409 1
    - Accuracy k-nearest neighbors: 0.87246715966 77
    - Accuracy decision tree: 0.947364579966922
    - Accuracy random forest: 0.958576507043324 5
  - CIC IDS 2017
- Identification of complex risks and attack patterns
  - deep learning / reinforcement learning, etc

Thank you for your attention!