

Security and Privacy issues in Structural Health Monitoring Systems

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Outline

- Motivations for SHMS
- Modelling SHMS
 - Adversarial model
 - Network model
 - Communication model
- SHMS Features
- S&P: What to focus on
- Conclusions

Motivation for SHMS

- Local damage detection methods (aka Non-Destructive Evaluation (NDE)), are old fashioned, well developed, highly efficient and used methods.

But...

- These methods have difficulties when large surface areas need to be inspected and when the damage lies below the surface.
- Need for global and automated damage detection methods.

Motivation for SHMS

- Economic and life-safety advantage
- New business models:
Manufacturers of large capital investment HW can **charge by the amount of life used** (instead of a time-based lease).

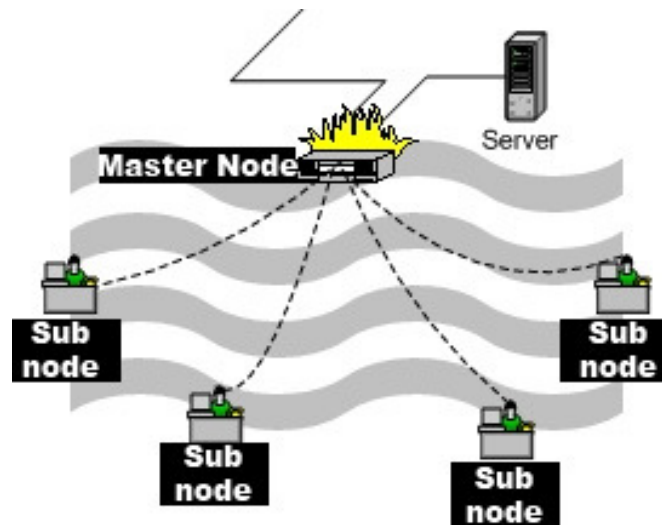


Adversary model

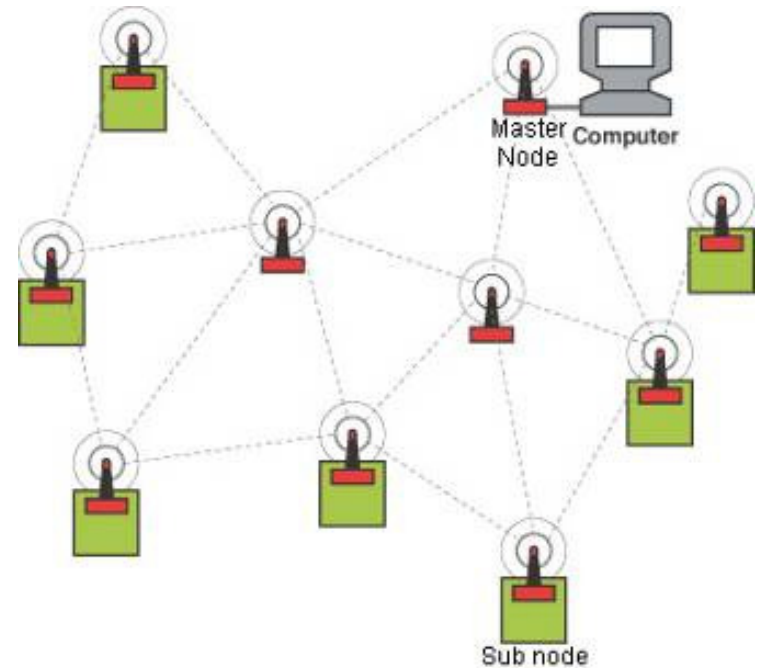
- Capabilities ?
 - Low end of the IT spectrum (hammer)
 - High end of the IT spectrum (Flamer)
- Motivations ?
 - Industrial espionage?
 - Of the nodes
 - Of the readings/activation
 - Data preview?
 - Service Disruption (even better: poisoning) ?
 - ...

Network model

- Singleton(s) ?
- P2M ?
- Mesh ?
- P2P ?



Point to Multipoint Network



Mesh network

Node-to-Sink Communication Model

To the extreme:

- Real Time/QRT off-loading ?
- Unattended ?

Features

- Unattended nature
- Cooperating capabilities (in some scenarios)
- Static (yes, but...)
- Not tamper proof
(but sometimes not easily reachable)
- Well defined domain of application

What's worth investigating/addressing

- Code attestation;
- Data poisoning;
- Node capture/replacement;
- Privacy (for some specific applications).

(you got it, it's a guess---an educated one 😊 ?)

Conclusions

- Unique features of SHMS
(individually, none of them is, but their combination is)
- S&P: years of contributions in the literature
for WSNs
(reinventing the wheel?)
- Where to spend effort/time (i.e. €) ?
(risk assessment driven)

- Thank you!
- Questions?

