Self-Adaptive Intrusion Detection Agents Based on OC Techniques

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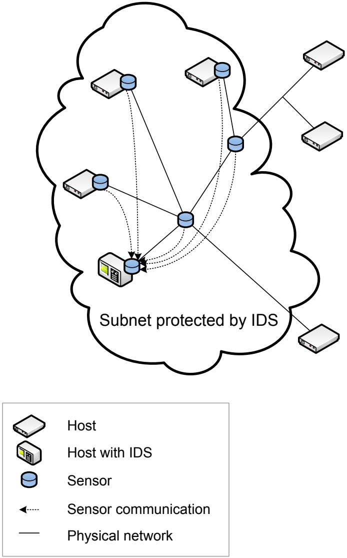
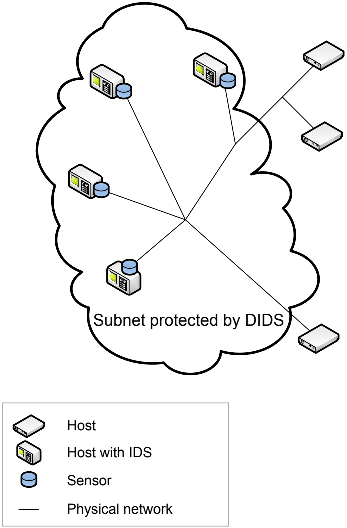
Intrusion Detection System (IDS)



- IDS protect computer systems
  - Objective: Scan data for intrusions and alert administrator
  - Scanned data: Network traffic, log files, firewall messages, ...
- Shortcomings of conventional IDS:
  - Single point of failure
  - Bottlenecks

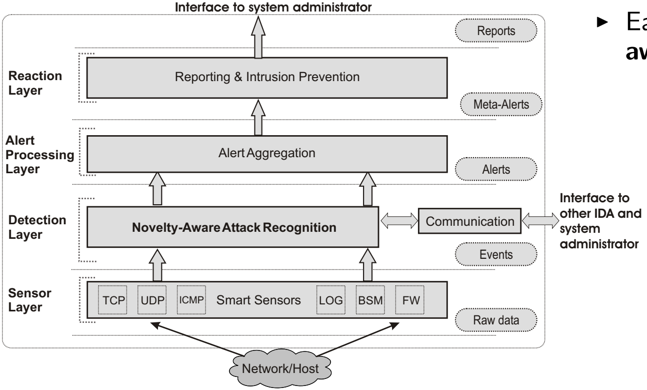
Distributed Intrusion Detection System (DIDS)



- DIDS to the rescue
- Existing work:
  - uses hierarchies with one or more central components
  - collaboration focuses on correlation of attacks

DIDS With OC Techniques

- Structurally similar Intrusion Detection Agents (IDA)

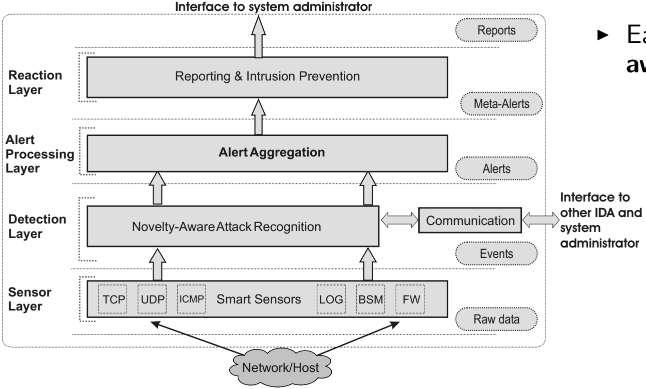


- Each IDA is **situation-aware** and **self-adaptive**:
  - ★ performs its own detection task locally
  - ★ is able to detect the need for new knowledge (i.e., new attack types)
  - ★ is able to handle this situation, i.e., learn new classification rules

- **Novelty-Aware Attack Recognition – Intrusion Detection With Organic Computing Techniques**, BICC2010 (review)

DIDS With OC Techniques

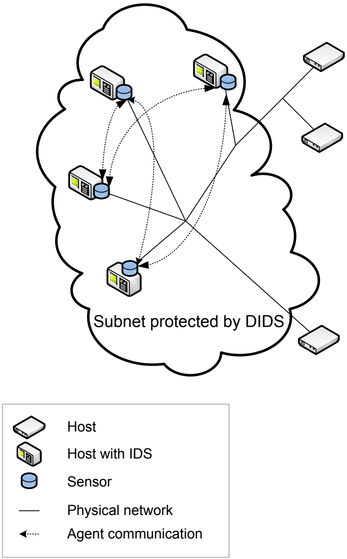
- Structurally similar Intrusion Detection Agents (IDA)



- Each IDA is **situation-aware** and **self-adaptive**:
  - ★ aggregation of produced alerts
  - ★ representation of current attack situation
  - ★ new knowledge corresponds to new attack instances

- **On-Line Intrusion Alert Aggregation With Generative Data Stream Modeling**, IEEE TDSC

DIDS With OC Techniques: Knowledge Exchange



- IDA exchange learned rules
  - enables **pro-active** behavior
  - rule integration is controlled by an assessment of rules

Thanks a bunch for your attention!

More information: `http://www.cis-research.de`