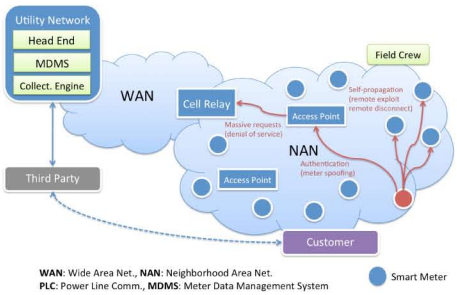
TCIPG Specification-based IDS for Smart Meters

R. Berthier, A. Fawaz, D. Grochocki, E. Rogers, and W. H. Sanders

Goals

- Design an efficient **monitoring architecture** to detect and potentially prevent intrusions targeting or originating from an advanced metering infrastructure (AMI).
- Implement a **prototype** of this monitoring solution and validate its accuracy and applicability.



WAN: Wide Area Net., **NAN**: Neighborhood Area Net.
PLC: Power Line Comm., **MDMS**: Meter Data Management System

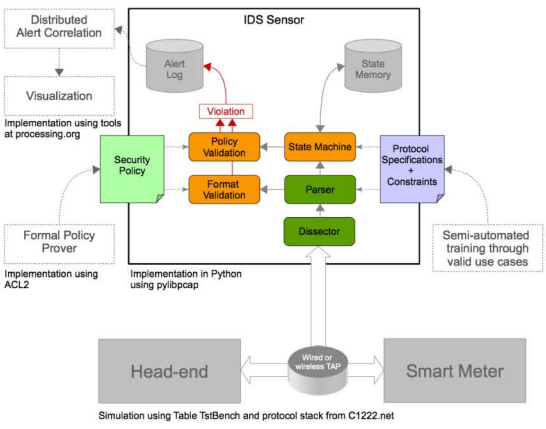
Fundamental Questions

- What are the threats targeting AMIs?
- What detection technology should be developed to cover those threats?
- What monitoring architecture should be deployed?
- What is the best way to automatically respond to security compromises?
- What is the best way to provide large-scale situational awareness?

Challenges

- Large-scale environment.
- Real-time and cost efficiency requirements.
- Sensors to run on low-computation hardware with limited memory.

Prototype in Development

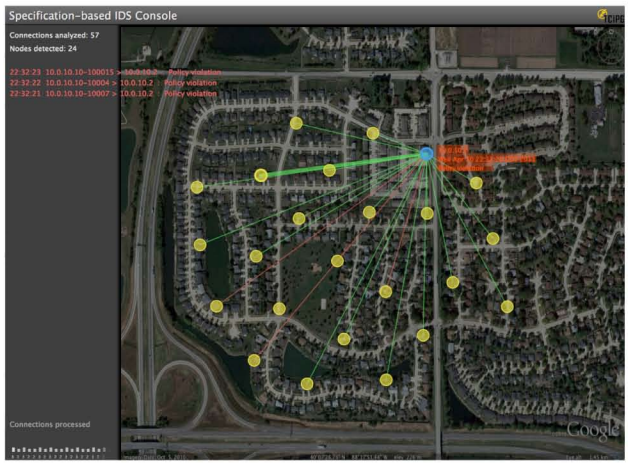


Simulation using Table TstBench and protocol stack from C1222.net

Broader Impact

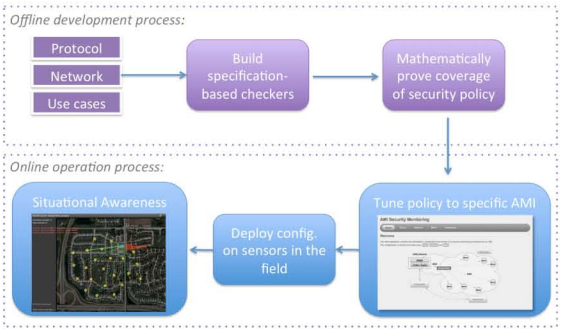
- Definition of a **rigorous process** utilities and vendors can use to design and develop an efficient monitoring architecture.
- Discussion with **industry partners** (Fujitsu, EPRI, FirstEnergy, and Itron) to collaborate on development and evaluation, and to plan for technology transfer.

Situational Awareness Solution



Research Results

- Comprehensive monitoring architecture implemented:



- Tested with real AMI equipment