AMI-SEC ASAP Red-Team Initiative

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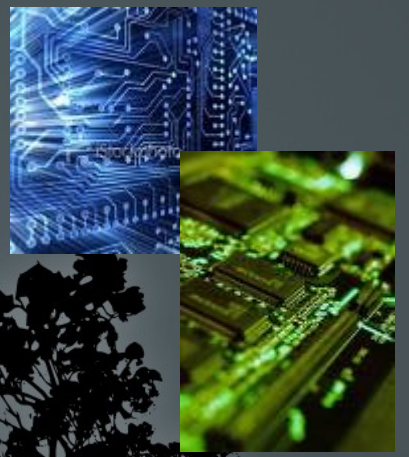
Purpose of Red-Team Testing

- Test the relative-security of existing meter solutions
- Identify Vulnerability Classes using a Bottom-Up Approach
- Real-World Security Pen-Testing Guidelines

Why Bottom-Up?

- Security Initiatives Start Top-Down.
  - Often identify things to protect
- Hacking often starts Bottom-Up
  - Identify what really exists
    - Keeping the "Prize" (at the top) in mind
    - Creatively leverage opportunities at the bottom
      - To impact Value-Streams at the top



Hacker's Serenity Prayer

- God give me the Serenity to:
  - Alter the Alterable
  - Get around the Unalterable
  - The Creativity and Tenacity to 0wn the System
  - and Never Give Up...

What is Alterable? (aka. What Can We Tickle?)

- Network Traffic
- Network Access
- Meter Access
- "Collector"/Bridge/Network Gear
- Head-End?

Network Traffic

- Capture
- Injection/Becoming a node
- Man-In-The-Middle
  - Firmware update
  - Interception/Modification of Command and Control
    - All your meters are belong to us
- Denial of Service
  - Complete
  - Selective
- Route-Manipulation

Network Access (HAN/NAN/WAN)

- Attacking Services provided by other Nodes on the Network
  - Similar to Internet-Attacks with Metasploit or Core Impact
    - Weak Authentication/Authorization
    - Buffer Overflows
    - Integer Over/Underruns
    - Format String Flaws
    - Sandbox Issues (and other Logic Flaws)
      - Bleed from HAN to NAN, etc...

Meter/Collector/Network Gear

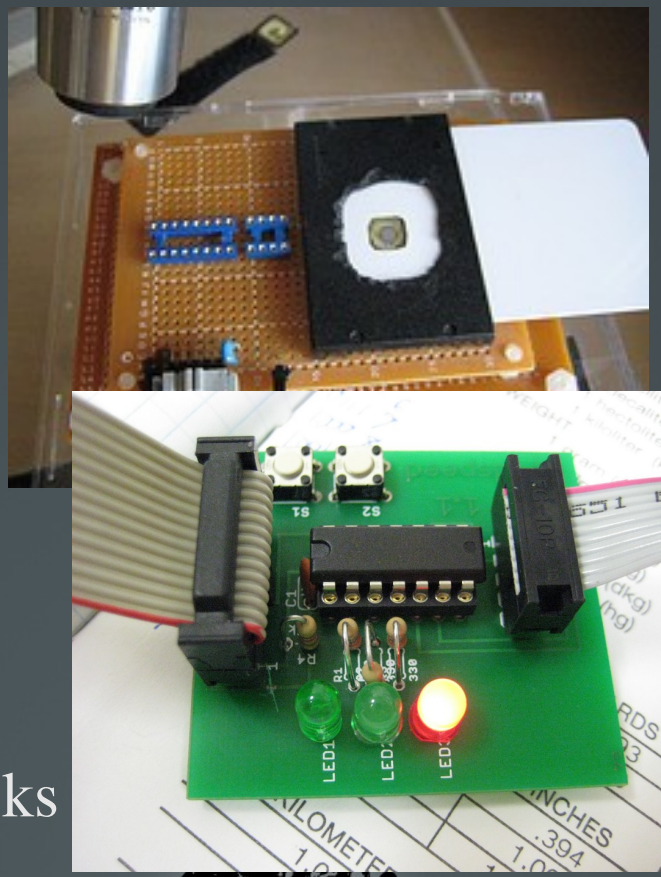
- Firmware removal and overwriting
- BSL Password Cracking
- Password/Crypto-key Capture
  - From Memory
  - Over I2C/SPI Bus
- More Man-In-The-Middle Attacks

Head End

- Not yet in scope for project, but...
  - Analyze Head-End System
    - Include Architecture and Code
    - Common IT Vulnerabilities?
    - Common Programming Errors?
  - Meter Impersonation?
    - False Data

Supporting Attacks:

- Crypto:
  - Steal from memory
  - Steal from circuitry (BUS attacks)
  - Crack over network
- BSL Cracking
  - Passwords
  - Bypassing Security Routines
- Firmware updates
  - Steal / Inject “Custom”
  - Stop "Security Bits"
- Timing and Power-manipulation Attacks
  - Skip/Stop execution of certain instructions
  - Manipulate erase procedures
  - Avoid setting the "Security Bits" during firmware upgrade



Control and Pwnership Metrics

- How damaging is any one vulnerability?
- Some architectures are supposedly more secure than others
- Prove it

Summary

- Identify key interfaces attackers can manipulate
- Analyze the outcome of that manipulation
- Test for Proof
- Evaluate Impact to Value-Streams