Smart Objects and the Internet Architecture

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RFC 6272

- I wrote, with a lot of help, a document describing the RFCs we write and use as a toolbox from which one can build products
  - This was requested by US NIST for the purposes of the Smart Grid
- If I don’t say so myself, it’s recommended reading
“...the Network should enable an application in a particular domain to communicate with an application in any other domain in the information network, with proper management control over who and where applications can be interconnected.”

NIST Roadmap, Version 1.0, September 2009
We have some real challenges out there

- Picking one…
  - Car companies tell us they want to burn a 128 bit address into an automotive appliance and use it to talk with the car’s “mother ship”
    - Services similar to OnStar
    - Automotive maintenance reports
  - No comprehension that the IP Address presumes an Internet Architecture in which the prefix is a *locator*, and has to be scalably routable by the ISP
  - No comprehension that an IP datagram is routed from and to a *customer*…

- A better alternative: an architecture for trusted communications
  - Whatever *address* I am using, I identify myself to my peer using protocol exchanges such as HIP/ESP or D/TLS
Don’t misunderstand the intent of networks of Smart Objects

- They don’t all intend to use the Internet as we understand it
  - Smart Grid, specifically, likely to be a parallel network for the most part
- They do plan to use IP and some of the related protocols
  - If a protocol doesn’t meet their needs, they plan to change or replace it
  - Health care likely a VPN, IPsec Transport Mode, https, or D/TLS-based
DOE / NIST / UCAIug / ASAP-SG Security Effort

NIST CSCTG

Risk Management Framework

Security Considerations

Mapping of Security Req’mts

Smart Grid Cyber Security Requirements

Smart Grid Security Profile Blueprint

R i s k A s s e s s m e n t

Advanced Metering

Network Type

Distribution Automation

Substation Automation

Security Profiles

ASAP-SG

US DOE

FFRDC’s
What kinds of security mechanisms?

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<th>Type of control</th>
<th>Example</th>
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<td>Data Content</td>
<td>End to end integrity in message-based exchange</td>
<td>W3C XML Signature</td>
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<td>Application Layer</td>
<td>Application to application authentication, authorization, encryption</td>
<td>TLS, HTTPS, DKIM, S/MIME, SSH</td>
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<td>Network Layer</td>
<td>System-to-system authentication, authorization, encryption</td>
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<td>Physical/Link Layer</td>
<td>Limited Membership</td>
<td>SSID, IEEE 802.1X with EAP-TLS</td>
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