Privacy and the Law in Demand Response Energy Systems

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Agenda

- Review Goals of Legal/Privacy Team
- Technology & Privacy – General Principles
- Current Project – Areas of Examination
- Questions to Ask
- Mapping Legal Rules Onto System Architecture
- Conclusion

Legal/Privacy Team Goals

- ✓ Meet with technologists, read literature, understand current and planned systems to assess the architectural and data needs of the system.
- ✓ Research existing federal and state law with respect to: privacy expectations in home versus business records; state regulations on use and disclosure of utility records
- Meet with users of ESP data (utility, regulator, law enforcement) to understand/survey institutional data practices and policies controlling data use

"…how, when, and at what level does privacy matter?"

- Importance of legal context as well as social context
- Expectations of privacy are shaped by what is technically possible, technical possibility in turn informs courts' analysis of reasonableness

Relation between technology and privacy

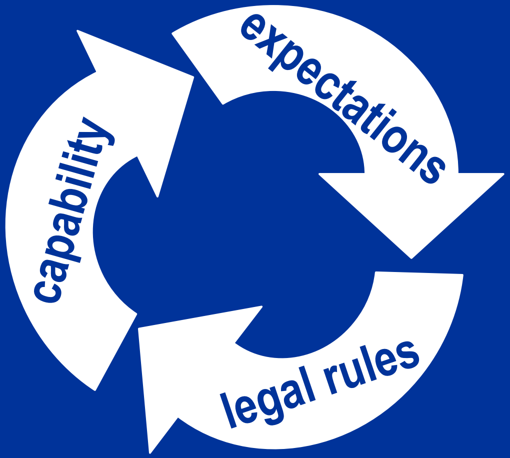
- **Micro level** – focus on empowering individuals – information and tools to effectuate privacy in various contexts

- **Macro level** – what kind of world do we want to live in

"It would be foolish to contend that the degree of privacy secured to citizens by the 4th A has been entirely unaffected by the advance of technology...the question we confront today is what limits there are upon this power of technology to shrink the realm of guaranteed privacy.“

-- U.S. Supreme Court, *Kyllo*

Status Quo, Technology, & Law



"reasonable expectation of privacy"

dog sniff, aerial photography

Thermal imaging

Distinctions

Is it sensed or recorded?

- Activity that generates records held by others
- Activity that is imperceptible without trespass
- Activity that can be perceived (sensed) from outside, “Plain view”
- Activity that is rendered perceptible by technology

Where is the activity taking place?

- home versus public street?

What is sensed?

- Just illegal activity, contraband?
- Mix of legal and illegal activities?

Pot diaries

- *Starkweather*

  “The public awareness that such records are routinely maintained…negate[s] any constitutionally sufficient expectation of privacy…”

- *Kyllo*

  "We think that obtaining by sense-enhancing technology any information regarding the interior of the home that could not otherwise have been obtained without physical intrusion into a constitutionally protected area constitutes a search -- at least where (as here) the technology in question is not in general public use. This assures preservation of that degree of privacy against government that existed when the 4th A was adopted."

- *Caballes*

  “Well trained narcotics detection dog, one that does not expose non-contraband items that otherwise would remain hidden from public view during a lawful traffic stop generaly does not implicate legitimate privacy interests.”

Lessons

- A little recording can mean a lot
- Location matters (people, activity, data)
- Use of well trained technologies (precise and accurate) by government with low false positives are outside the 4th A because they are not searches (at least in some instances)
- "Police only" technology is unreasonable invasion, readily available technology maybe not

Current Project:

Demand Response Energy System

Three Areas of Examination

- Sensor networks within home
  - High expectation of privacy; legal protections through property and privacy; potential of network to expose information to others without trespass
- Flow of data to utility
  - Change in form of data and change in data capture may be significant for privacy; potential to expose increasing amounts of private activity to third parties; relationship between strong privacy property rules protecting home and weaker rules in data maintained by utility
- Gateway device
  - Software? Service? Who owns and controls? Implications for privacy

Three Implementation Scenarios

- Centralized Implementation
  - Data concentrator located on utility premises
  - Control of load through a broadcast network
  - Communications to utility through one-way collector network
- Distributed Implementation
  - Intelligent portal located on consumer premises
  - Portal controls load based on pre-configuration by consumer
  - All communications to and from utility go through the portal
  - Separate commercial WAN used for communications
- Hybrid Implementation
  - Third-party data and network management services

Overview of Use and Disclosure in Three Implementation Scenarios

- Possible threats to privacy
  - Anti-competitive use of consumer data
  - Sale and disclosure of consumer data in “business records”
  - Unregulated, unrestricted access to real-time information

- Entities we’re concerned about having access to data
  - Public utilities
  - Private third parties
  - Law enforcement

Questions to Ask

- Meter and Storage:
  - Where, at what level of granularity, and for how long data is captured, transmitted, and stored?
- What are the conditions for:
  - Reuse?
  - Access?
- Access to what?

Public Utilities

- Current privacy protections for utility records
  - Business records: some confidentiality protections, minimal legal process protections
  - Personal information protections

- Designers ought to consider these privacy principles
  - Where is the intelligence, at home or at the utility?
  - How much data must be reported, full disclosure to concentrator or calibrated disclosure from portal?
  - Where is data stored: home/ utility/ third party?

Third Party Data Managers

- Generally, fewer protections apply
- Designers ought to consider
  - At what level of granularity does the information leave the home (where is the intelligence)?
  - How will the communication channels work: full access, or separate pathways requiring formal audit policies?

Law enforcement access

- Current rules for tech-assisted criminal investigation: relatively stringent (*Kyllo*)
- Current rules for law enforcement access to utility records: lax
- How to reconcile the two?
  - Will unfiltered sensor network data be accessible to law enforcement?
  - Spectrum of access:

    monthly utility bills → sensor networks
- Designers should consider:
  - *Where do police access information?*
  - *What kind of information is available at that point?*

Mapping Legal Rules onto System Architecture

Goals

- Keeping data in the home to the extent possible, and protecting it to the extent possible when it does leave the home
- Demonstrating where security concerns aren’t coextensive with privacy concerns:

  Once access is granted, what protections govern the process and aftermath of access?
- Hard (technology) v. soft (legal) protections: we seek to protect privacy prospectively, in design

Elements Analyzed

- Drawn from reference design: structural and functional elements, combined
  - Resources
  - Consumer Appliances
  - Utility Applications
  - Wide Area Network

Resources

- Resources are *information* and *storage*
- Goals: define purposes for data use, limit data disclosure to support only those purposes

Anonymity → *Pseudonymity* → *Nymity*

Consumer Appliances

- Appliances are
  - Internal: sensor network, thermostat
  - Internal/ external: meter, portal/ concentrator/ gateway
- Goals: Keeping data management functions at home (prevent creation of business records), minimizing data storage and maximize audit controls

Utility Applications

- Goal: ensure that *ever-evolving* rules for information processing/ transfer always incorporate privacy
- Applications allow utilities to access meter data to fulfill specific functions:
  - Load forecasting and scheduling coordination
  - Marketing and rate management
  - Assets and service management
  - Billing systems
  - Settlement
  - Customer Care
- Designers ought to consider
  - Identifying data requirements exactly
  - Creating separate pathways for billing/ pricing
  - Interoperability
  - Crisis management

Wide Area Network

- Goals:
  - protect raw usage data from entering external networks as much as possible
  - at every step, minimize granularity of information transmitted
- Unclear whether state and federal law provides any protections to this WAN. . .

Summary:
Value-Driven Architecture

- Architectural choices constrain policy
- Policy choices if considered in architectural design can be “hardened”
- Need to identify policy goals – privacy, security, other – in order to engage in iterative process during design phase
- Must understand stakeholder needs, technology, law, and have clear objectives

Summary:
Legal/Privacy Next Steps

- ✓ Meet with technologists, read literature, understand current and planned systems to assess the architectural and data needs of the system.
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- Meet with users of ESP data (utility, regulator, law enforcement) to understand/survey institutional data practices and policies controlling data use

Legal/Privacy Team

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