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Colorado State University

Secure Communication for Advanced Metering that Preserves User Privacy

Cyber attacks and invasions of privacy via advanced metering infrastructure have become a much greater concern as power information is shared over Internet connections. While conventional encryption techniques can address security concerns, few are able to address the need to protect consumer privacy—including privacy from the monitoring being done by the power company. The smart grid market is projected to reach $9.6 billion by 2015, so demand for improved metering techniques will increase dramatically.

Researchers at Colorado State University have devised an encryption system to ensure both smart grid network security and data privacy to power companies and their customers. The system uses homomorphic encryption to ensure that all data transferred over the network is unavailable to any third party that may access it. The data is encrypted by each smart meter and then decrypted once it arrives at the power supplier's utility server using multiple encryption keys.

Uniquely, this technology is also able to address user privacy through an in-network aggregation scheme that sums the data before it arrives at the power provider. The result is a system where the power company can respond to the needs of a user area (e.g. small, residential area) but each user is the only one with access to the high frequency data of the user. The system can also incorporate dynamic pricing, as the dynamic rate can be sent to each meter for local calculation of price.

The encryption system ensures security and user privacy in many ways:

- Smart meters are securely authenticated
- Only authorized personnel with proper credentials can access information
- Individual user information is aggregated before arriving at the data collector
- Privacy is assured in that individual user information is only available to the user
- Power company receives actionable, aggregated data for an area

This new secure data transmission technology will be especially useful for power suppliers who already use or are looking to develop smart grids. Concerns about data privacy and security can be resolved with this technology—customers can be assured that their information is private and power suppliers that their grid is less vulnerable to attack.

Patent Information
U. S. patent rights available

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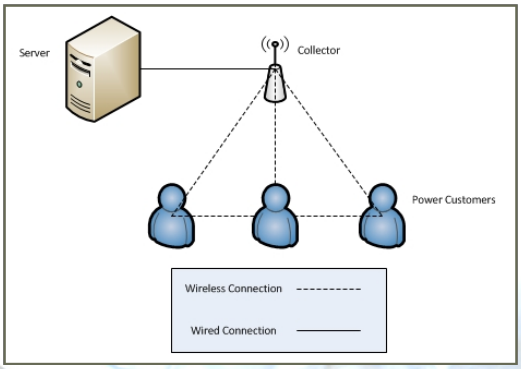

Features and Benefits

- Secure smart metering of power grids via homomorphic encryption scheme
- User privacy maintained by aggregation of data prior to arrival at power company
- Automatic meter reading, dynamic pricing, and real-time monitoring of grid
- Secure, private metering expected to increase consumer support for advanced metering

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