Certicom AMI 7000

Revolutionizing AMI Security

Improve operational security with robust and flexible solutions for utilities.

Certicom's **Advanced Metering Infrastructure** (AMI) series 7000 appliances are a turn-key system that improves operational security with flexible solutions. The 7000 series provides a secure layer between the utility head-end and the meter via high-speed encryption and key management.

Certicom is the world leader in **elliptic curve cryptography** (ECC) selected by NSA to secure classified government communications as it provides the highest security per bit. This allows the AMI 7000 series to provide un-paralled security with minimum network overhead. Such security is critical when deploying millions of meters which are two-way capable and can send meter data to the utility as well as receive other commands from the utility.

Improve security.

- Prevent false commands and replay attacks triggering load shed.
- Prevent counterfeit meters and devices from utilizing the network.
- Prevent eavesdropping and malicious infiltration of metering network.
- Comply with ANSI C12.22 and NERC/FERC Critical Infrastructure Protection (CIP) requirments.
- Deploy millions of devices with a future proof technology, suitable for an in-service life of 20-30 years.

"Certicom's infrastructure offers unparalleled network and metering system security, further enhancing our energy management and measure ment technologies as we work toward development of the Smart Grid".

Ross Vanos, VP Marketing at Itron

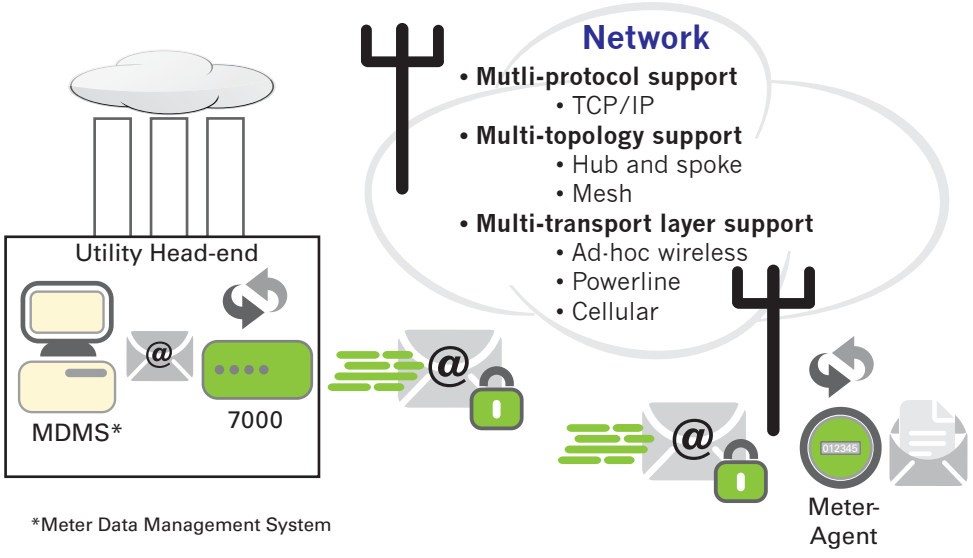
Improve costs.

- Outsource manufacturing and installation of meters.
- Broadcast commands to individual meters, groups of meters, or all meters.
- Reduce cost and risk at the utility head-end in terms of operating and backing up systems. Also, eases outsourcing such systems to third parties.
- Eliminate risk of system wide key exposure and need to store a symmetric key for every meter at the head-end.

"Remember the days when meters were in people's basements and in some cases, customers would provide utilities a copy with a key to their front door, in which case, utilities had to store the keys in a vault and put in place strict controls and procedures to ensure the sanctity of the key. Storing a distribution of symmetric keys is very analogous".

Industry Executive

A turnkey solution consisting of secure, scalable and production hardened appliances for the head-end and light-weight software agent for the meter.



*Meter Data Management System

BlackBerry | certicom

Lightweight, ironclad security.

Advanced Meter Infrastructure 7000

Why PKI?

Why ECC?

- ECC offers highest security per bit of any PKI system
- At NIST recommended security levels RSA keys are 9X to 12X larger than ECC keys of equivalent strength (e.g. 256 bit ECC vs. 3072 bit RSA)
- ECC binary curves at 283 bits are deemed secure until 2030

Proven

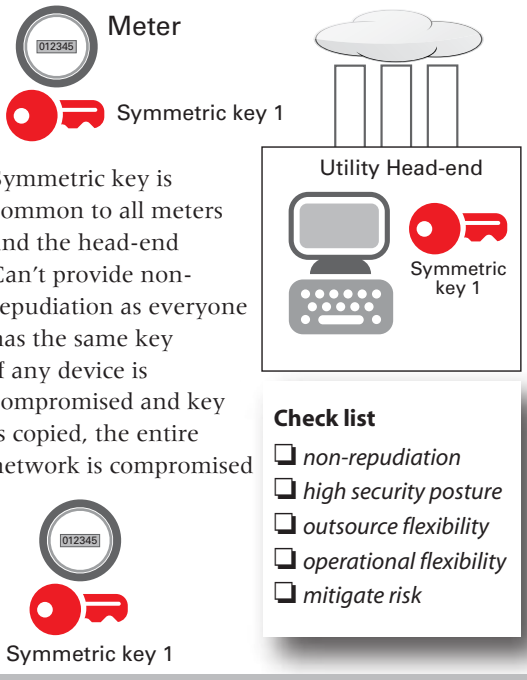
- ECC deployed on over 50 million handheld devices
- AMI 7000 deployed at a number of utilities including SDG&E and SCE
- ECC is the only public key cryptosystem endorsed by the US government for use past 2010

Lightweight

- mininimal impact on network bandwidth and overhead as ECC provides the highest security per bit, a light weight infrastructure:
- **At the home**, the meter agent, is small and lightweight, ideal for low-power microprocessors. As a reference point, ECC is part of the ZigBee Smart Energy profile, which runs on even smaller, lower-power, battery operated devices
- **At the utility head-end**, a single rack of equipment can support millions of meters

Key Management: Symmetric Key

Case 1: Same key for each meter

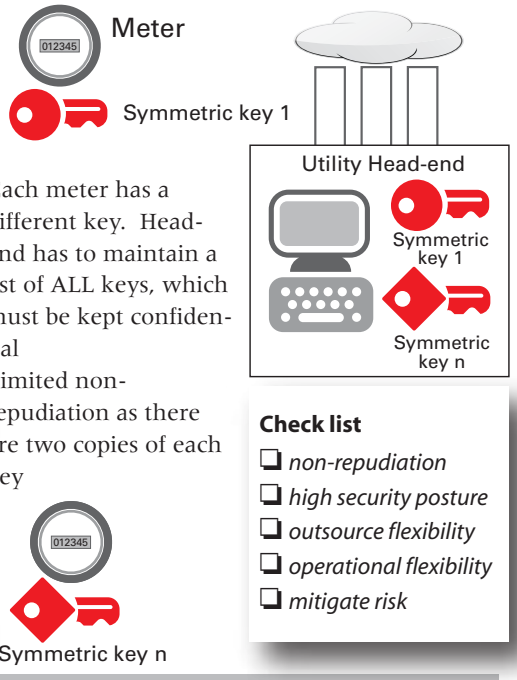


- Symmetric key is common to all meters and the head-end
- Can't provide non-repudiation as everyone has the same key
- If any device is compromised and key is copied, the entire network is compromised

Check list

- ❑ *non-repudiation*
- ❑ *high security posture*
- ❑ *outsource flexibility*
- ❑ *operational flexibility*
- ❑ *mitigate risk*

Case 2: Different key for each meter



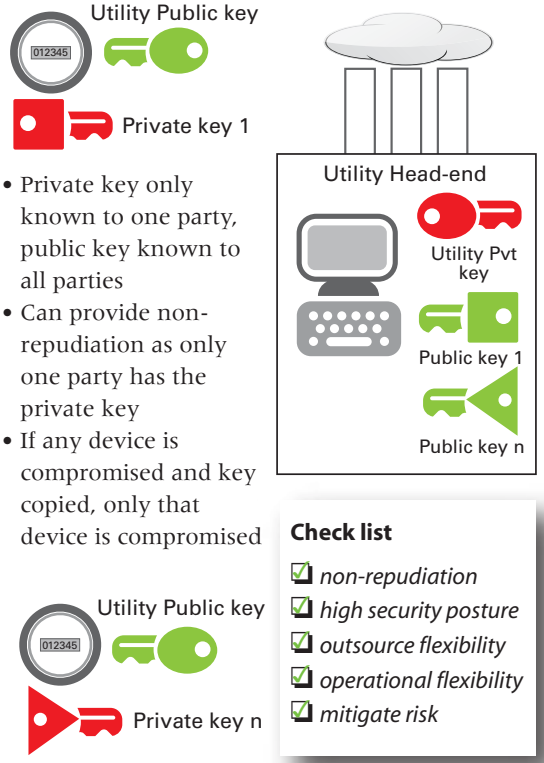
- Each meter has a different key. Head-end has to maintain a list of ALL keys, which must be kept confidential
- Limited non-repudiation as there are two copies of each key

Check list

- ❑ *non-repudiation*
- ❑ *high security posture*
- ❑ *outsource flexibility*
- ❑ *operational flexibility*
- ❑ *mitigate risk*

vs. Public Key Infrastructure (PKI) ECC ✓

- ▼ PKI enables secure key agreement schemes to establish pairwise shared secrets suitable for symmetric cryptography
  - Keys are generated in pairs; a "**private**" key and a corresponding "**public**" key
- ▼ The private key is only known to one entity which uses it to:
  - Sign messages that can be verified by any entity using the corresponding public key
- ▼ All messages from the utility head-end are signed using it's private key (to which only it has access). These digital signatures, used with utility's public key provide receiving meters:
  - Authentication - message as coming from utility
  - Data-integrity - high assurance the message hasn't been modified
  - Non-repudiation - meters have ability to demonstrate it acted appropriately on a utility sent message
- ▼ Utility head-end can send signed messages not only to individual meters, but, to groups of meters, or, even all meters
- ▼ Authenticated meter enrollment with secure over the air (OTA) key provisioning and updates
- ▼ PKI is widely used in a number of applications including internet web browsers (SSL/TLS)
- ▼ Strong technical controls at the meter head-end:
  - critical system keys protected by hardened security appliances
  - strong two-factor authentication and logging to protect system access



- Private key only known to one party, public key known to all parties
- Can provide non-repudiation as only one party has the private key
- If any device is compromised and key copied, only that device is compromised

Check list

- ☑ *non-repudiation*
- ☑ *high security posture*
- ☑ *outsource flexibility*
- ☑ *operational flexibility*
- ☑ *mitigate risk*

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