What We Do

Cloud Services

ZigBee® Wireless

Smart Meter

AMI Network

Utility
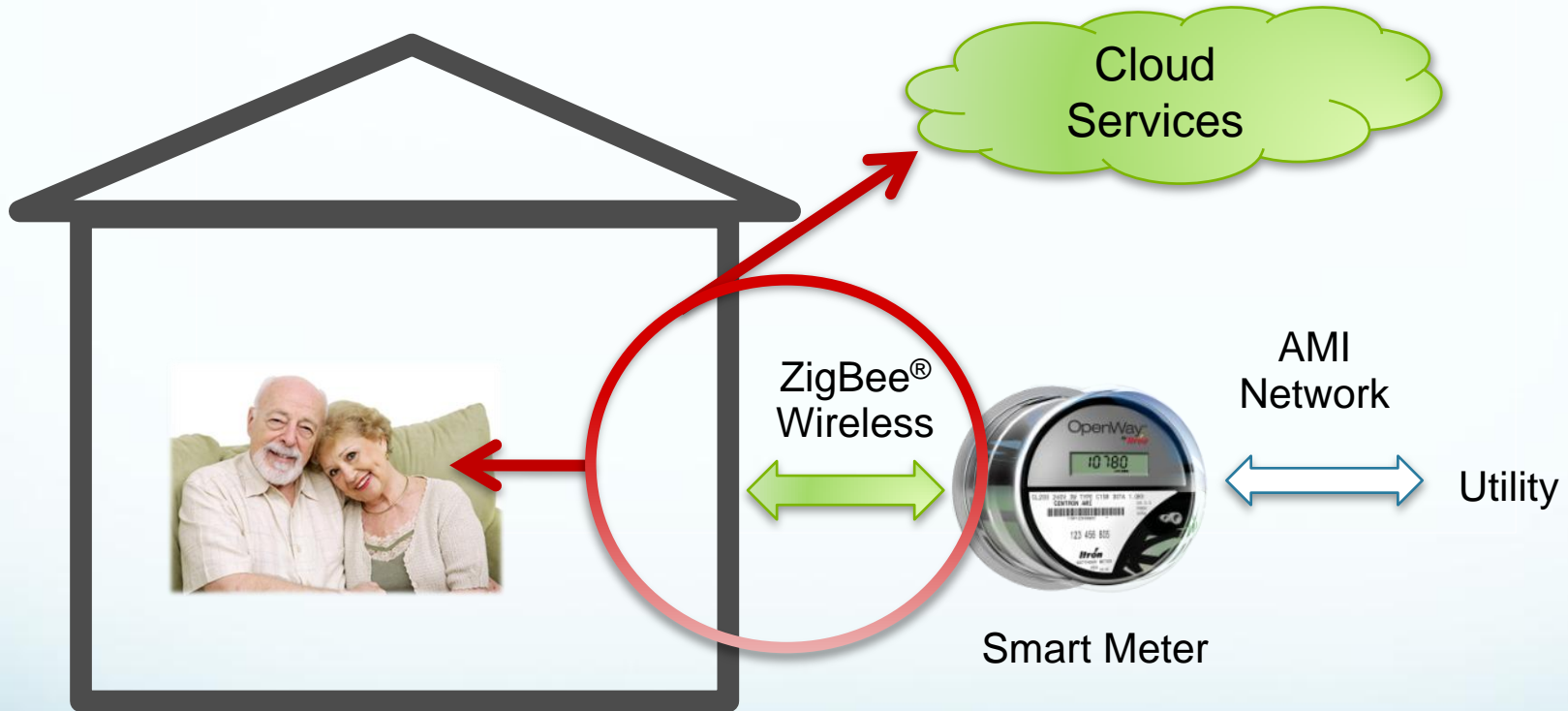
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EMU™

Energy Monitoring Unit

- **Certified**
  - ✓ ZigBee Smart Energy 1.0
  - ✓ Certicom Production Certificates

- **Simple**
  - ✓ Straightforward user interface
  - ✓ Easy commissioning
  - ✓ Battery operation

- **Versatile**
  - ✓ Multiple languages, prepay, text messages, gas, water
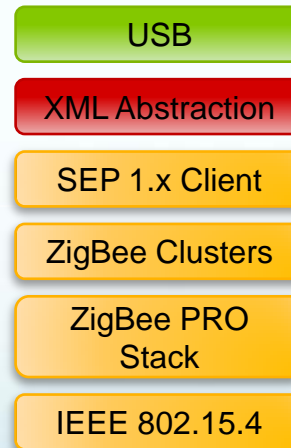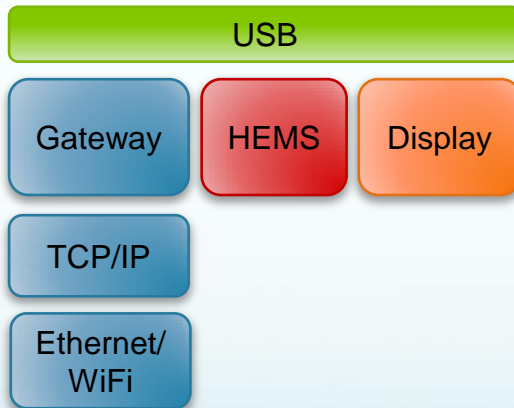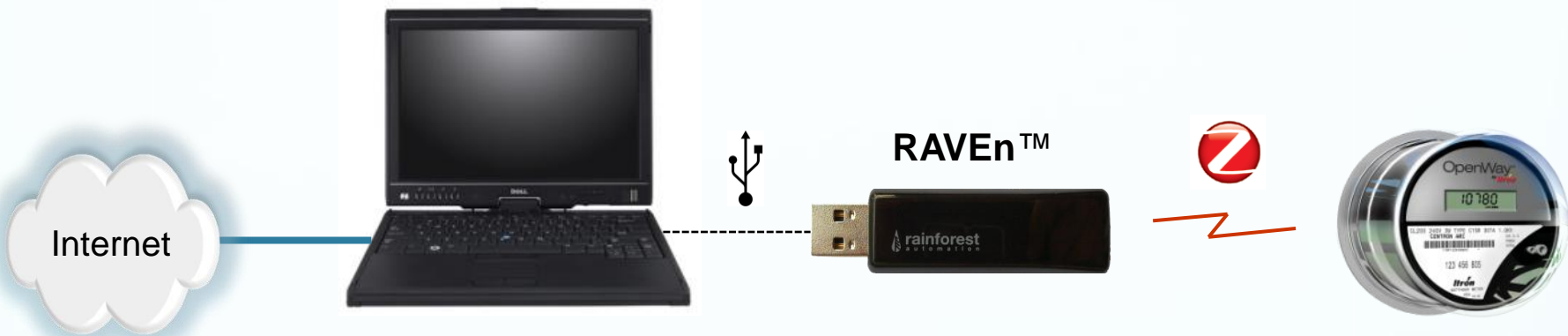 - ✓ Custom development available

- **Low Cost**

RAVEn™

Radio Adapter for Viewing Energy
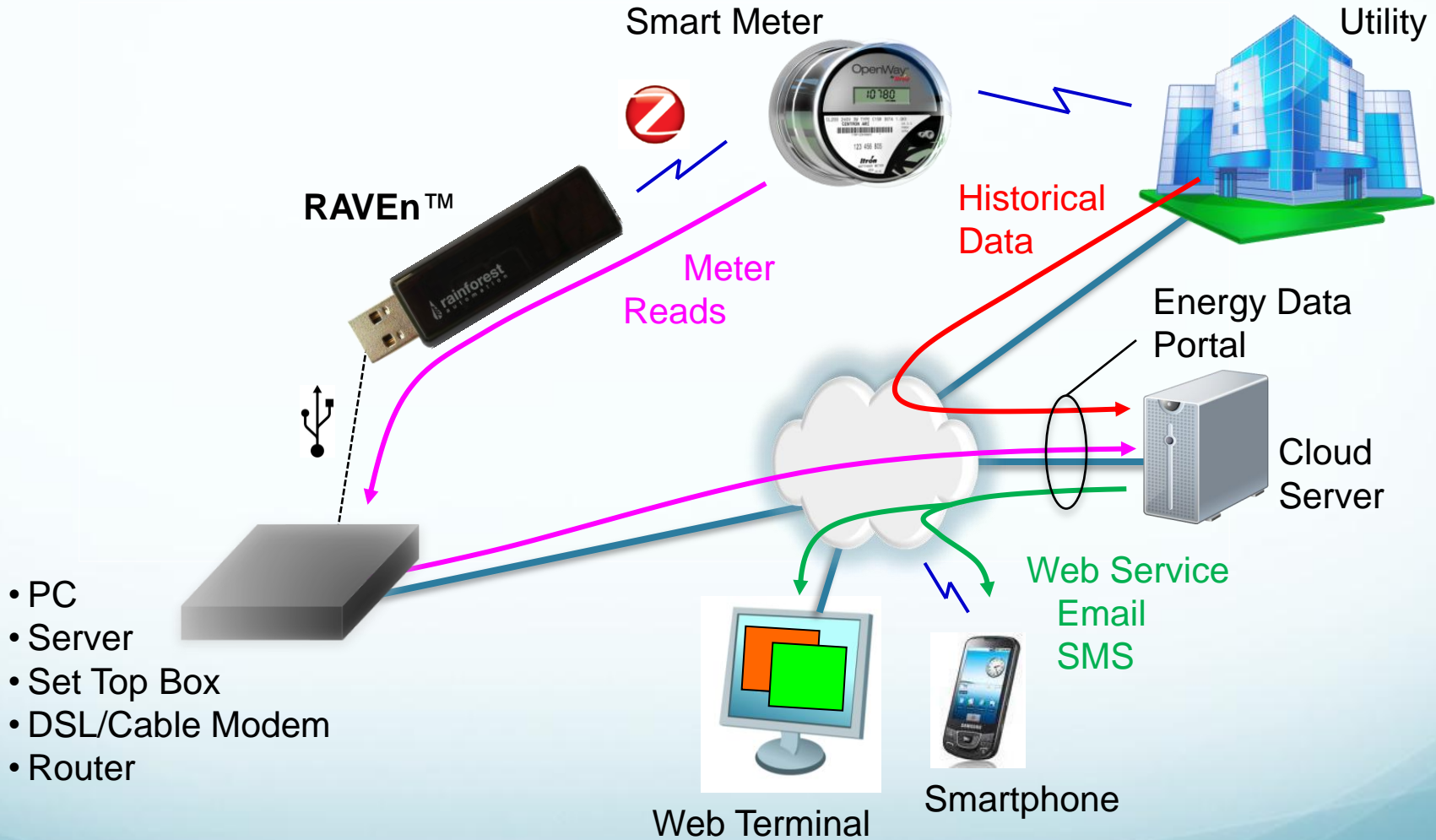

- IHD on a USB stick

- Provides smart meter data to any PC

- Simple interface to third-party software

Works with Any USB Host

RAVEn™

Internet

USB

| Gateway | HEMS | Display |

| TCP/IP |

| Ethernet/ WiFi |

USB

| XML Abstraction |

| SEP 1.x Client |

| ZigBee Clusters |

| ZigBee PRO Stack |

| IEEE 802.15.4 |

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Data Flow

Smart Meter

Utility

RAVEn™

Meter Reads

Historical Data

Energy Data Portal

Cloud Server

- PC
- Server
- Set Top Box
- DSL/Cable Modem
- Router

Web Service
Email
SMS

Web Terminal

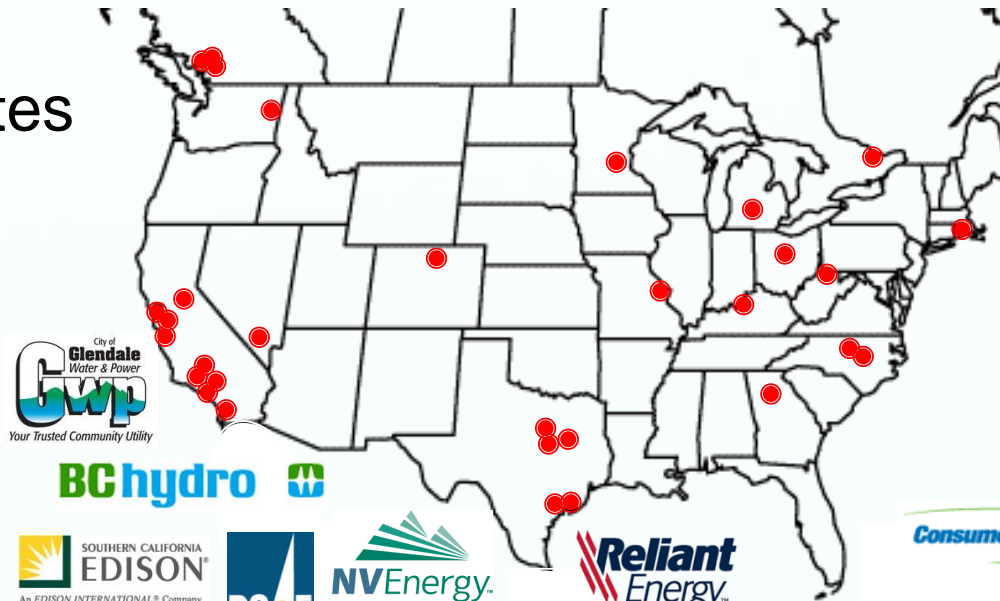Smartphone

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We Work With

- Utilities

- Home network equipment providers
  - ➢ Home Automation
  - ➢ Home Energy Management System (HEMS)
  - ➢ LAN equipment (routers, PCs)

- Communications network providers
  - ➢ Cable companies, Telcos, Mobile

- Cloud service providers

- Consumers

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Market Traction

- 40+ evaluation sites worldwide

- US, Canada, Australia, UK

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Texas Experience

- TDU lab evaluations

- REP lab evaluations

- ZigFest interop events

- CenterPoint IHD field trial

- Direct consumer trial

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Issues Encountered

- Deployment of HAN devices is very slow!

- SMT portal still has problems

- SMT user interface is daunting for consumers
  - ➢ 94 page User Guide

- #1 customer support issue is provisioning
  - ➢ Major root cause is user input error
  - ➢ Recommend automating user input

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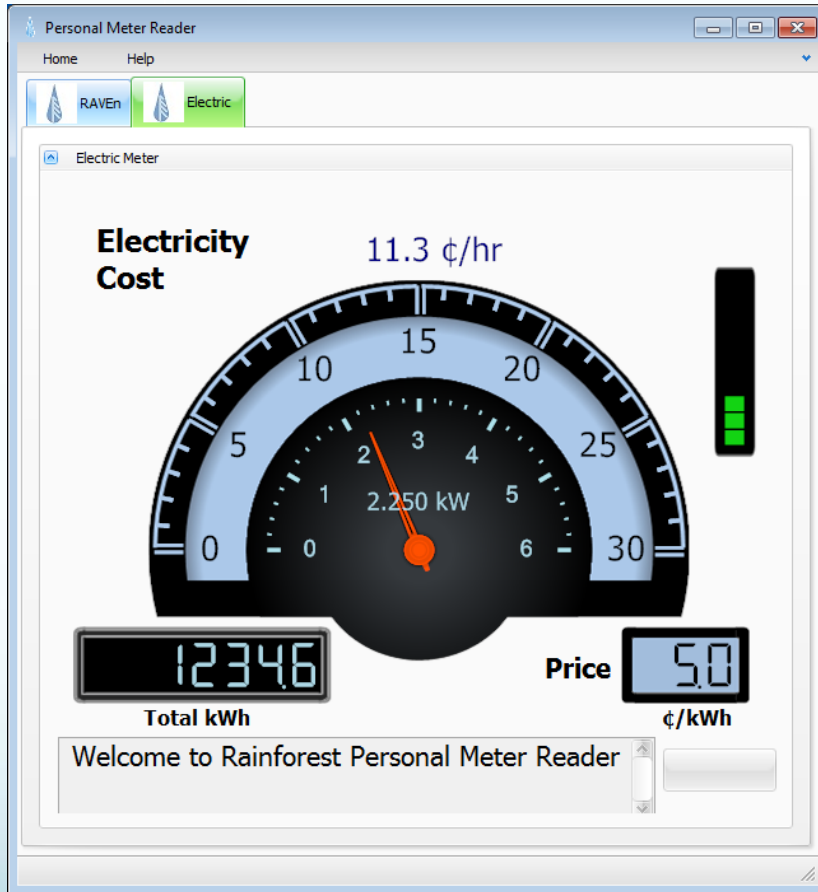a u t o m a t i o n

Pricing Conundrum

- Energy price is competitive information
  - ➢ REPs do not want price published in meter

- Manual input of price is tedious and error-prone

- How to do price-based Demand Response?

- Need an encrypted channel for pricing
  - ➢ Rainforest can provide this

Good Environment for HAN

- Open, competitive market
  - ➢ The only AMI network in the US where HAN devices can be freely provisioned

- Strong user demand for HAN devices

- Positive response from users

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Additional Slides

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Personal Meter Reader™ **SW**

- Free download with **RAVEn**™

- Real-Time energy usage on your PC

- Easy to use

Internet Appliance

- 8" color touch screen
- Open-source Linux software
- 1500 free apps available
- Acts like a simple Gateway

Chumby App

Other Form Factors

chumby™

Chumby R

Chumby 8

Sony DASH

Message Tunneling

- Short, text-based packets imbedded in standard ZigBee text messages
  - ➤ Transparent to the AMI network and smart meter

- Initial price can be sent in "Welcome" message
  - ➤ No manual user input needed

- Price can be encrypted for security

In-Home Display

Smart Meter

Text [price] Message

MDMS

Account #

Pricing Info

CIS

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Smart Plug

- ZigBee enabled switched plug

- Responds to DRLC and Price events

- Measures energy delivered
  - Supports Simple Metering Cluster

ZigBee® Certified product

Energy

certicom™

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Load Controller

- ZigBee enabled high power load switch

- 3 relays, each up to 30A, 240V

- Responds to DRLC and Price events

- Measures energy delivered
  - ➤ Supports Simple Metering Cluster

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Thermostat

- ZigBee PCT

- Responds to DRLC and Price events

- Easy to use

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