



FUTURE DASH

See Your World Differently

EnergyBuddy HEMS & Plug Load Monitoring / Control

Kevin Strong - CEO

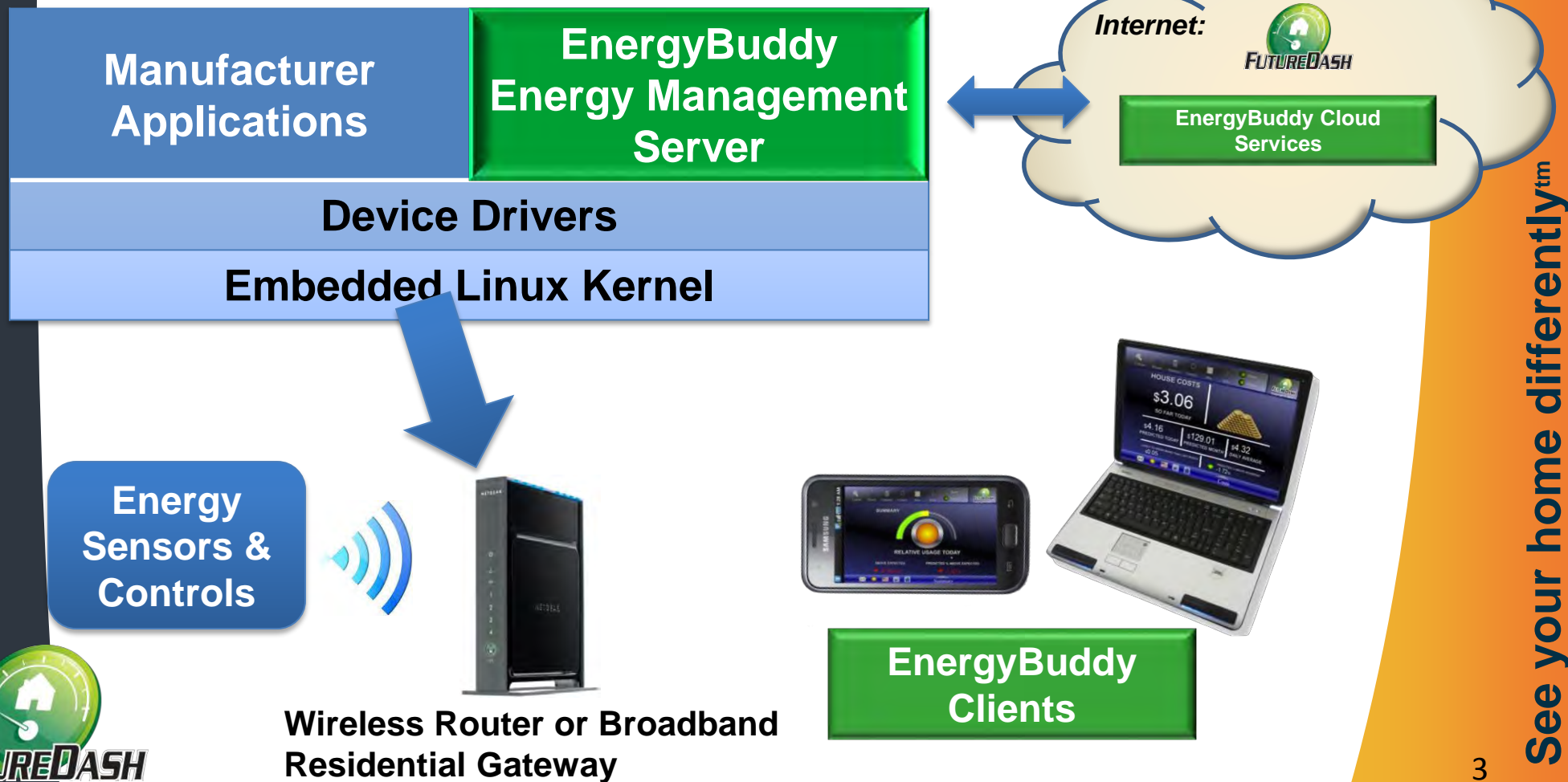
FutureDash

- Orange County startup & CalPlug Member
- EnergyBuddy Smart Energy Platform: Flexible software and hardware platform for energy centric home automation
 - Core technology: unique cloud-assisted wireless sensor network platform and powerful real-time embedded analytics engine
 - Mobile apps for monitoring & control
- Product development for base product at beta
- Advanced demand-response and automatic energy management features under trial with Ergon Energy, Queensland, Australia



Core Software Platform

- Application software for embedded Linux devices such as Wireless Routers, Broadband Residential Gateways & Set-top Boxes
- Easily ported to OEM / Service Provider platforms (Embedded Linux)
- Supported by EnergyBuddy Cloud Services



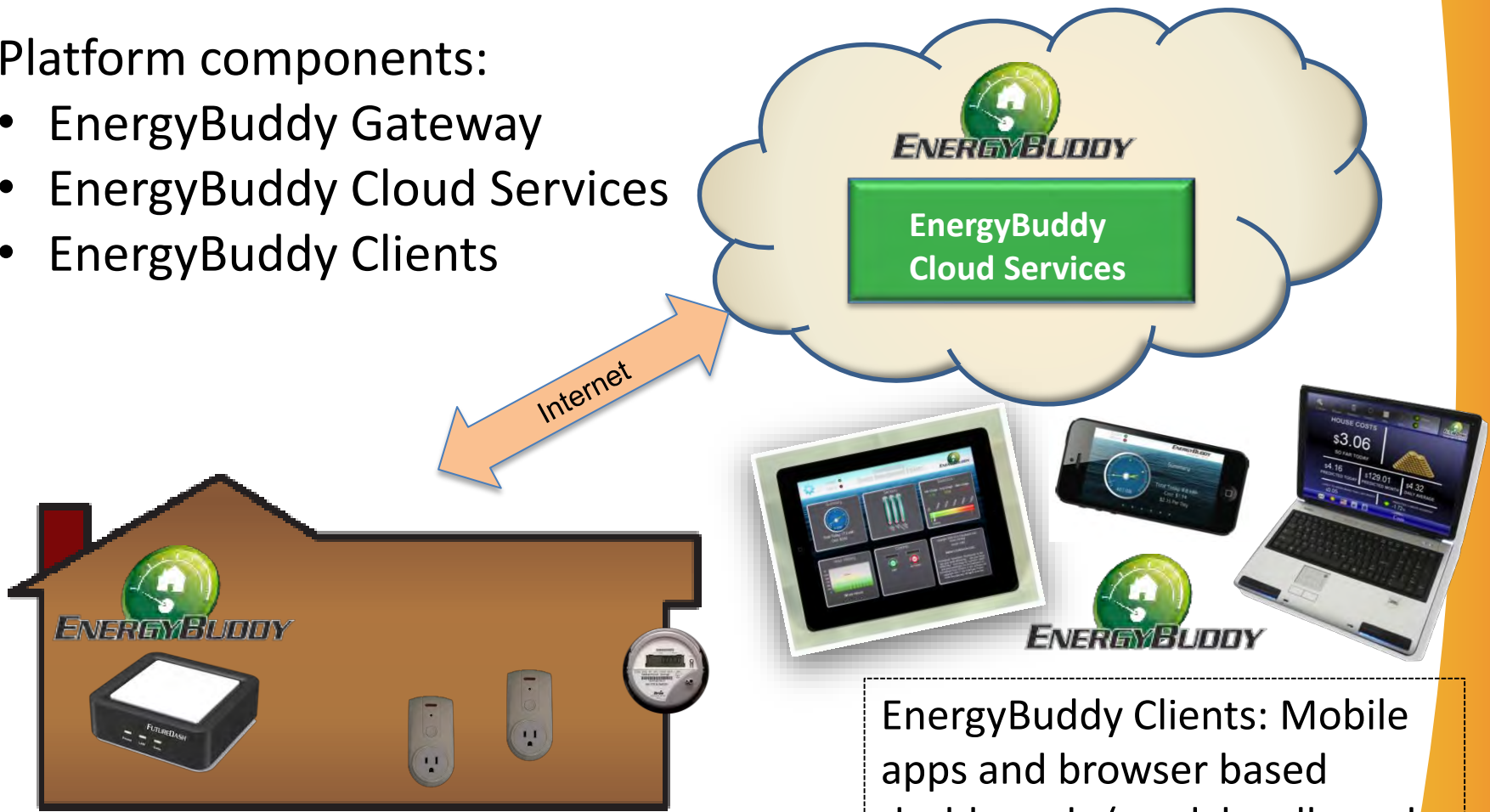
See your home differently™



EnergyBuddy Smart Energy Platform

Platform components:

- EnergyBuddy Gateway
- EnergyBuddy Cloud Services
- EnergyBuddy Clients



EnergyBuddy Gateway

- Embedded in router, networked CE device or standalone
- Communicates with energy sensors & controls, and smart meter

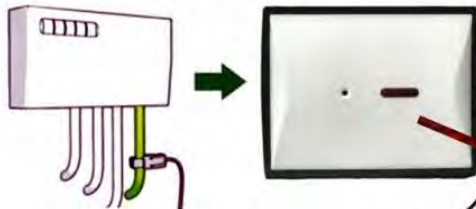
EnergyBuddy Clients: Mobile apps and browser based dashboards (work locally and remotely)



See your home differently™

EnergyBuddy system

Readings from electricity panel via current sensor and transmitter unit



EnergyBuddy Gateway:

- supports up to 4 different wireless technologies simultaneously for HAN
- connects to LAN via WiFi or ethernet



Readings from AMI Smart Meter with ZigBee SE



'Whole Home' energy data via HAN

LAN (via Ethernet/WiFi)

WAN (via Internet)



Compatible Smart Plugs

Individual circuit and appliance data monitoring and 'On/Off' controls

Energy Dashboards

(viewed on customer's computers, smartphones, tablets and smart TVs)

Energy Dashboards (viewed remotely)



See your home differently™

EnergyBuddy Kit



Agnostic Software Platform

- Can simultaneously support multiple communication & protocol technologies with energy sensors & controls in the home:
 - Today: ZigBee HA, ZigBee SEP1.x, Proprietary 433MHz, WiFi
 - Future: SEP2.0, Bluetooth, Z-Wave, PLC...
- Cloud services link HEMS with 3rd party services:
 - Today: OpenADR 1.0
 - Future: OpenADR 2.0, Green Button, comparative energy use, other smart home services....



EnergyBuddy™ Gateway



- Flexible hardware & software platform for appliance / device monitoring and control
- Available in standalone & embedded versions
- Simultaneously supports multiple different wireless standards & technologies for communicating with sensors and controls
- Connects to LAN via WiFi or Ethernet
- Embedded Linux OS & 360MHz MIPS processor
- Manages sensor network & communicates with EnergyBuddy Cloud Services & Clients
- Luminescent glowing top for instant energy use indications (Standalone version)



Supports 3rd party energy sensors / controls



ZigBee energy monitors & load controllers



Multi-circuit energy monitoring devices (ZigBee communications)



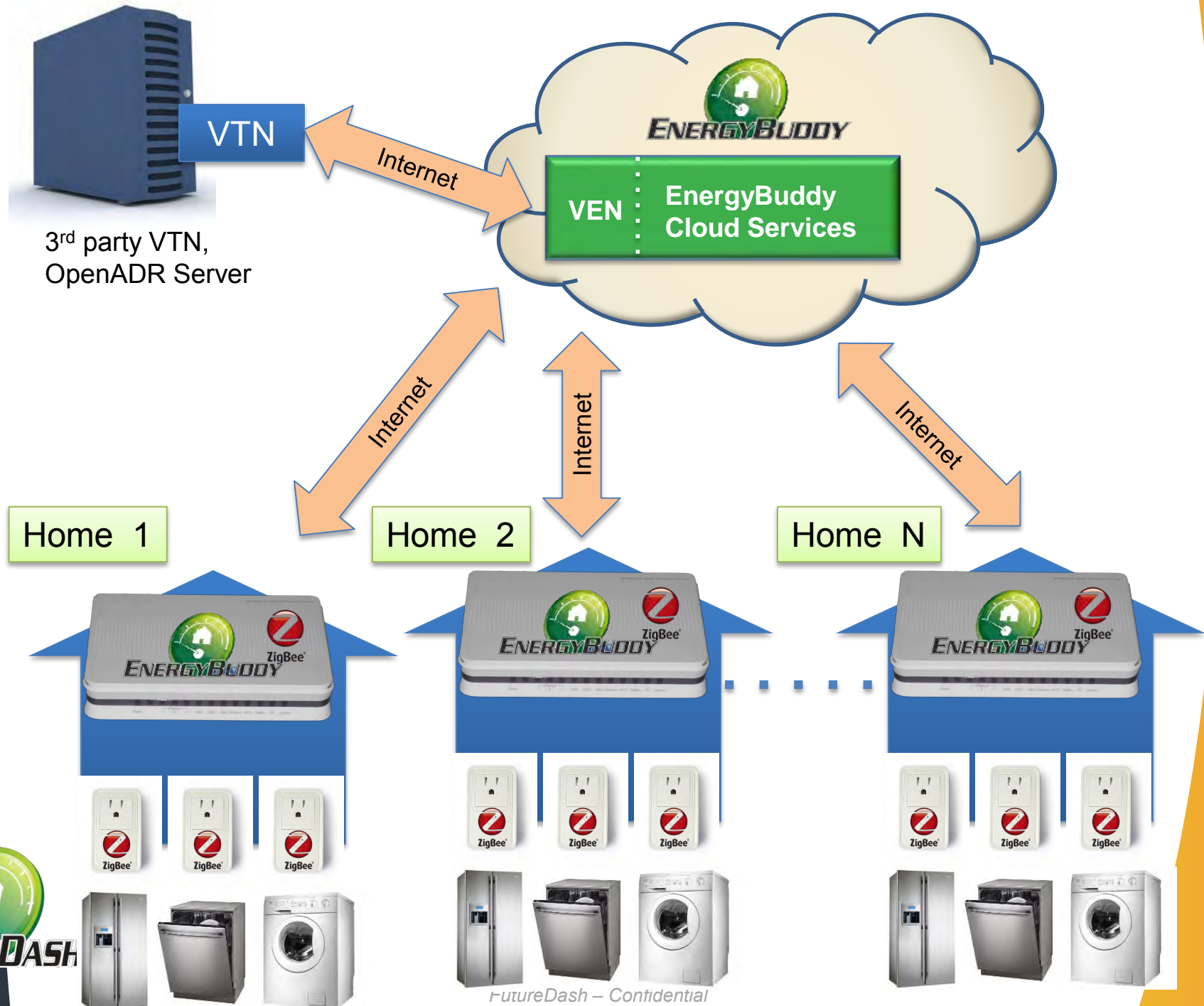
Future: Communicating Thermostats

Ergon Energy Trial: Auto Load Shedding Features

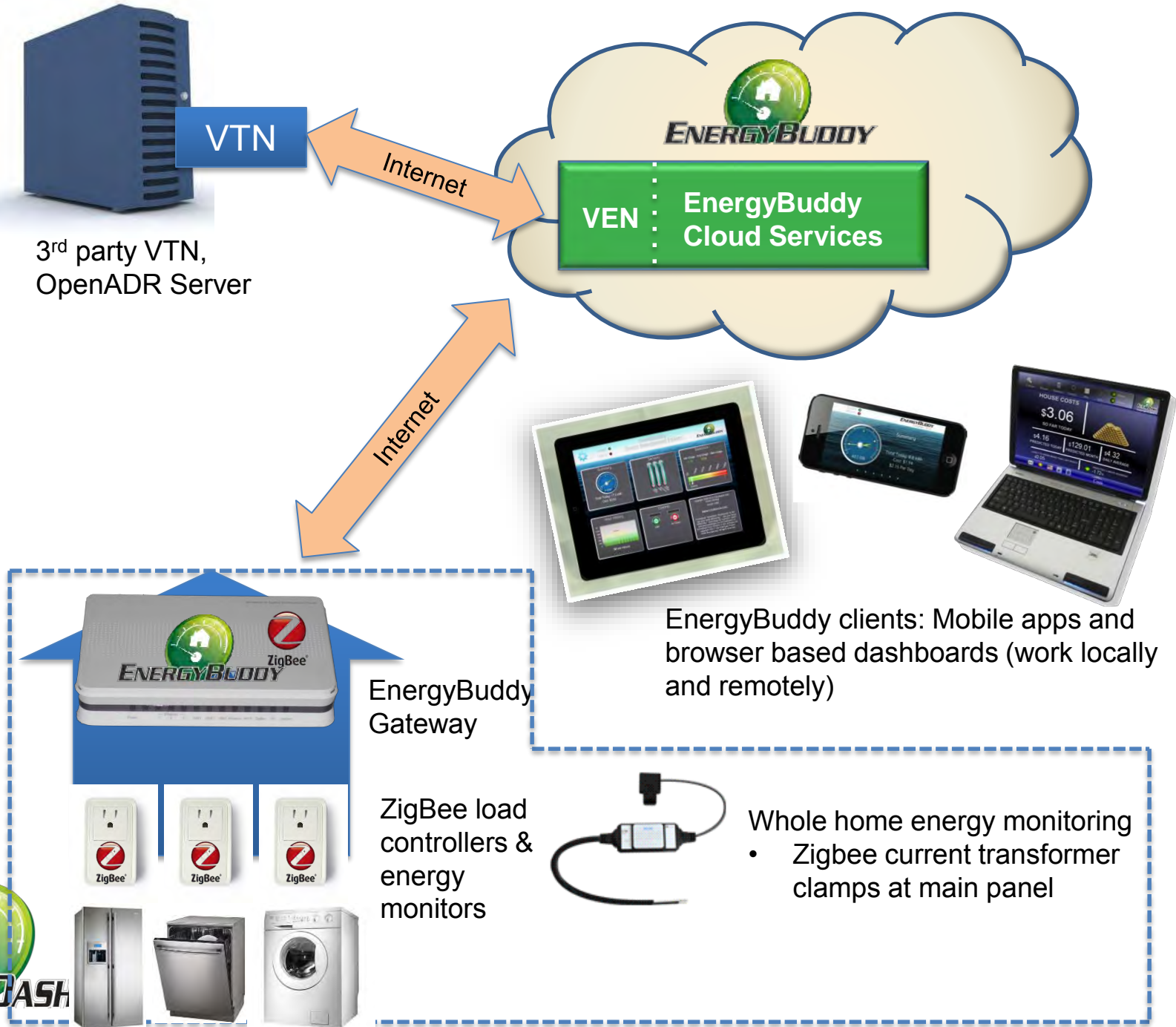
- Demand Limiting Mode
 - Maintains energy consumption below a user defined threshold
 - Sheds devices based on user defined ranking
- Cost Limiting Mode
 - In conjunction with TOU tariffs
 - Ensures devices / appliances only run below user preset cost thresholds
- Automated Demand Response Grid Event (Auto-DR)
 - OpenADR compliant automated demand-response
 - User opt-in
 - Sheds devices based on user defined ranking



Ergon Energy trial: Top Level Architecture



Ergon Energy trial: Individual Home Architecture



Smart Home / IoT standards & technologies

Physical layer

- WiFi
- ZigBee
- HomePlug
- Z-Wave
- Bluetooth
- Ethernet
- Other PLC
- Other RF (433, 900MHz...)

Protocols

- ZigBee Home Automation
- ZigBee Smart Energy Profile 1.x
- Smart Energy Profile 2.0
- 6LoWPAN
- DASH7
- Proprietary...

Plug-in modules for appliances

- CEA-2045



Issues for mass deployment of networked plug loads

- Communications technology
 - Physical and protocol
- Application technologies
- Cost, size, power consumption for integrating directly into plug load appliances and devices
- Privacy and security



Wrap Up

- Platform flexibility is key in the nascent home energy management market
- Standards are critical for market development – but are there currently too many and what will drive a shakeout?
- EnergyBuddy is a highly flexible consumer centric HEMS system with plug load monitoring & control

