

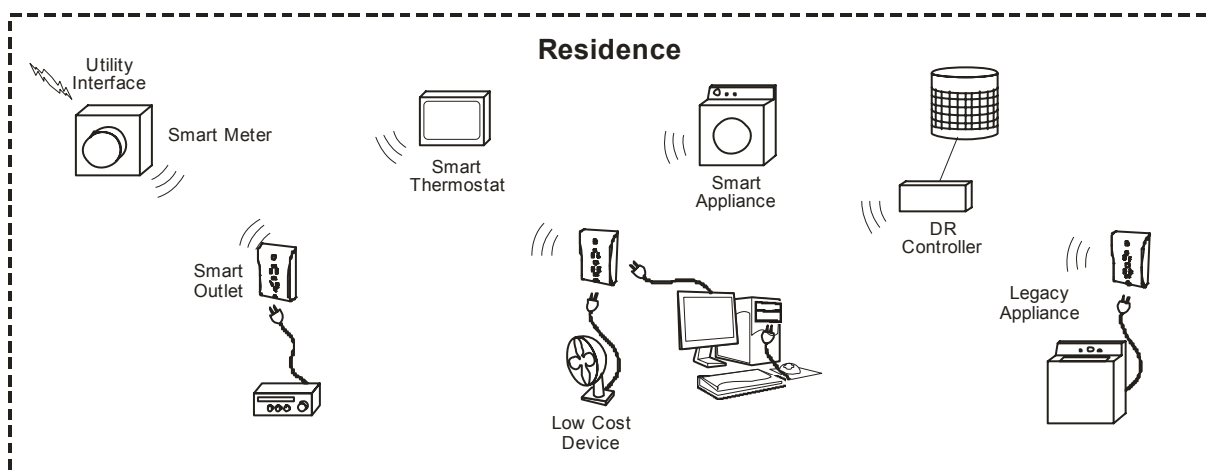
## Introduction

The RightPlug Standard defines requirements for digital encoding of electrical plugs. Smart outlets with access to equipment-specific information stored in each plug effectively extend the reach of smart grid technology down to the individual appliance level.

This document is intended to provide an introduction to the synergies between smart grid technology and digital plug encoding according to the RightPlug Standard.

## Smart Outlet Technology is Better with Smart Plugs

### Example Smart Home with Smart Outlets

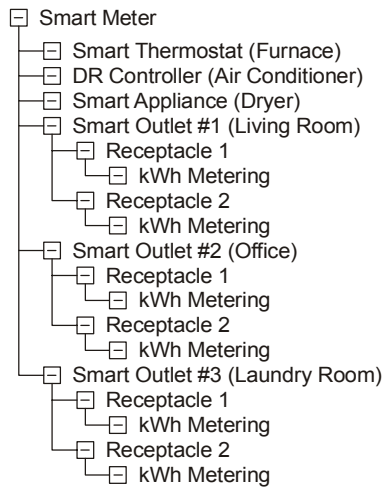


### Description

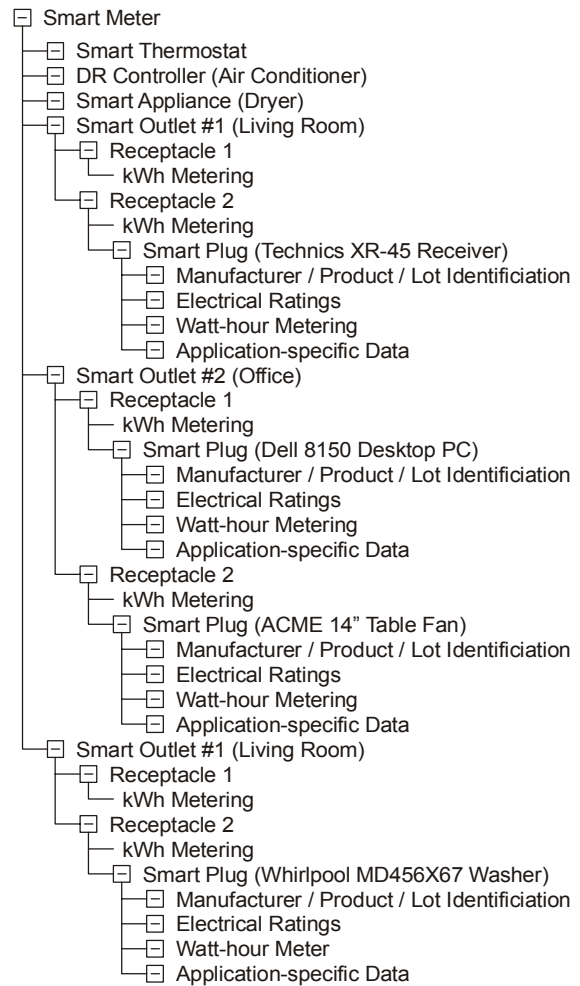
- Home is equipped with a smart meter (or similar device) providing gateway functionality
- One or more smart devices directly connected to the Smart Meter via HAN:
  - Smart thermostat with dynamic setback capability
  - Smart appliance incorporating direct interface to HAN (ie. dryer)
  - DR controller supplied by utility connected to a large load (ie. air conditioner)
- Smart outlets directly connected to the smart meter via HAN
- Other “non-smart” devices not compatible with HAN
  - Low cost appliances and equipment too cost-sensitive to embed HAN communication
  - Legacy equipment that does not include HAN communication

Logical  
View

Without Smart Plugs



With Smart Plugs



Features

- Meter measures whole-home energy consumption
- Smart Thermostat, DR controller and Smart Appliances are individually monitored
- Smart outlets are monitored
  - System relies on user to configure appliance/receptacle relationships
  - Energy is monitored only at a receptacle level
  - Appliances moved from one receptacle to another is not detectable
  - Energy consumption is tracked only at the receptacle without regard for the various appliances that may have been plugged in
  - HAN may be self forming, but relationship between appliances and outlets requires user interaction
- DR possible at the receptacle level, but without regard for the appliance that is currently plugged in

- Meter measures whole-home energy consumption
- Smart Thermostat, DR controller and Smart Appliances are individually monitored
- Smart outlets are monitored
  - Receptacles detect and report appliances currently plugged in
  - Energy is monitored at the individual device level
  - Appliances moved from one receptacle to another are automatically detected
  - Total energy consumption is tracked at the appliance level, independent of where the appliance has been plugged in and whether it has been moved.
  - 100% dynamically self-configuring
- DR possible at the device level, regardless of where the appliance is plugged in.

## **Conclusion**

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RightPlug digital plug encoding technology is an open standard defining an extensible means to store equipment-specific information within electrical plugs.

Smart plugs get smarter when they have information about the equipment currently plugged in.

- Tracking energy usage at the device level rather than the receptacle level
- Automatically adapting to equipment moving from one outlet to another
- Enabling DR programs for portable appliances (small air conditioners, space heaters etc.)

The smart grid gets smarter with equipment-level access

- Finer resolution of energy consumption of individual loads, especially portable devices
- Extends “smart grid” functionality to extremely low cost devices
- Extends “smart grid” functionality to legacy devices, reducing the time to realize benefits of energy management programs.